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Improved Combination of Fire Engines with Locomotives.

The officers and managers of railroads have long felt the need of some efficient and ready means for extinguishing fires, which are so liable to occur in and about the machine shops and other buildings at the several stations. Mr. Dyer Williams, Master Mechanic of the Middle Division of the New York Central Railroad, has devised a very simple combination, which most effectually accomplishes the purpose. At the principal stations of all the large railroads, a locomotive is kept for the purpose of transferring the cars from one track to another, and otherwise moving them about the station as required, and Mr. Williams conceived the idea that if a compact steam pump were attached to this switching engine, it would form a most effective means of extinguishing fire, which would always be at hand and ready for instantaneous use. He accordingly worked out the details and applied for a patent, which was granted by the department, and we present an illustration of the plan in the accompanying engravings.

The claim in the Letters Patent applies to any form of steam fire engine, the engraving represents the one invented by Birdsill Holly, which was illustrated and fully described on page 129, Vol. H. (new series) SCIENTIFIC AMERICAN. It is a rotary engine and pump, and is represented in cross section in Fig. 2 of the engravings. Two cylinders are coupled together as shown, and in these, two revolvers, *a* and *a*, are fitted to turn steam tight. The steam enters at *b*, and is discharged at *c*, as indicated by the arrows. The pump is of precisely the same construction. The manufacturer says that this rotary engine and pump has been tested on a large number of fire engines now in use.

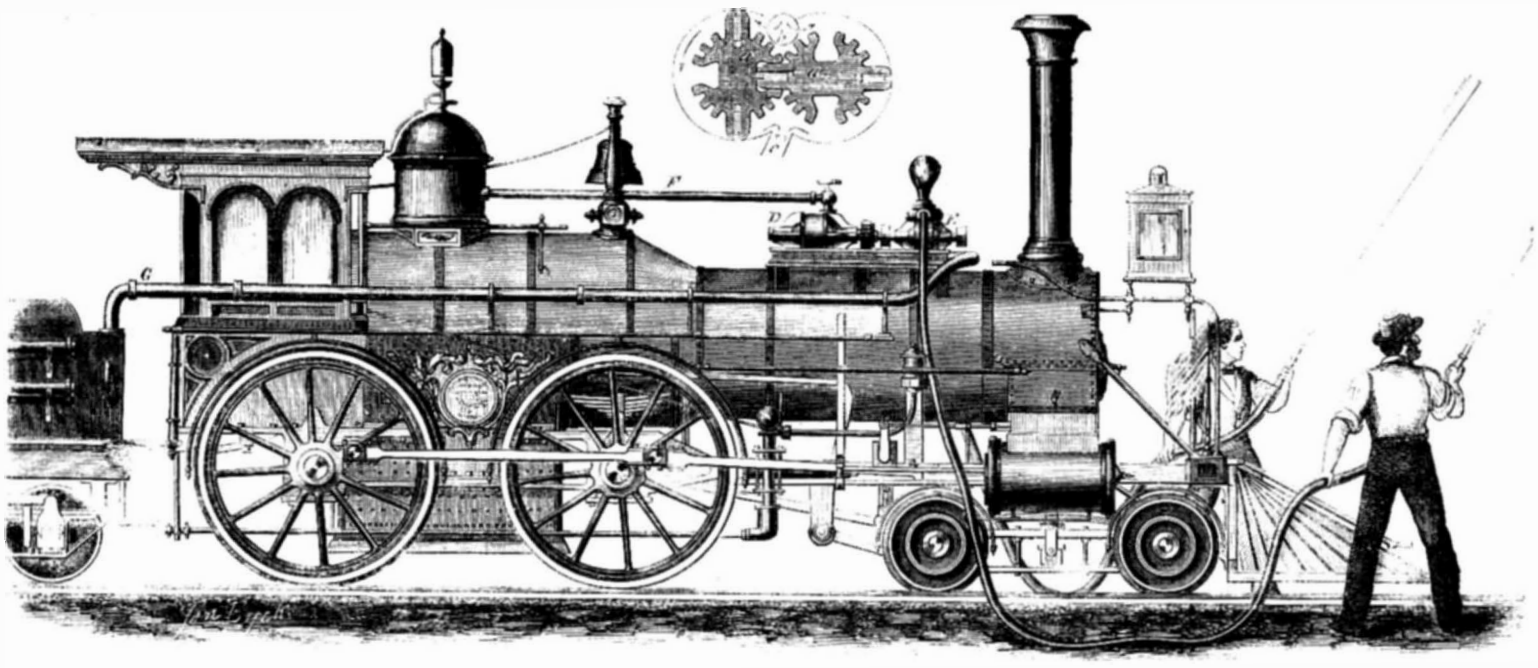
In this cut, D represents the engine and E the pump. A steam pipe, F, connects the engine with the boiler, and a water pipe, G, leads from the tank in the tender to the pump. Two discharge pipes are connected with the pump, and to these hose may be attached, to throw two powerful streams of water at the same time.

The inventor has fitted one of these engines for the Syracuse station of the New York Central Railroad, and in relation to it he says :—

"The tank holds about 2,500 gallons of water, and it requires about eight minutes to be pumped empty, through an inch and a quarter nozzle, running the engine at as great a speed as the hose will bear. It is obvious that this size stream, thrown with such force, must extinguish a good deal of a fire, and by which time an additional supply of water could be flowing into the tank, either from the numerous large water tanks which supply the locomotives in the engine houses, or from the hydrants about the yard, or depot, or anywhere along the line of track, down nearly to the tunnel.

"This engine is also intended to be used for the extinguishment of any fire that may originate through the central part of the city, say within 1,500 or 2,000 feet of the line of track, as there is a hose cart or real, attached to the top of the tank, on the rear end, which carries at all times a large supply of extra hose for this purpose, as also to reach wood piles and station buildings along the line, where there is not a supply of water. In addition to the suction hose, which is in all cases to be attached to the tank, where water can be supplied to the tank, there is carried on the sides of the tank, by means of hooks or brackets attached for that purpose, four pieces of extra suction hose of 14 feet in length each, which can be attached to the usual suction hose, making in all about 80 feet, to be used as occasion requires. For instance, when at a wood pile that is on fire along the line where there is no head or elevation of water from which to fill the tank, this hose can be disengaged from the tank, and connected together, and lead off into a stream or pond, within 80 feet, or the length of the suction hose, and the length of suction can be extended to almost any length, so that almost invariably a fire can be reached either by a long suction or long leading hose, or both combined. There is also attached to the pump a length of hose of 50 feet, with hose pipe attached, coiled up, and ready for instant use, so that all that is necessary to be done to start a 1¼-inch stream of water, in case the building where the engine stands should take fire, is to straighten out this hose, and open the throttle valve of the fire engine. This can all be done by one man, and in less than one minute from the time he steps into the locomotive. The engineer and fireman, and others who man this machine, all live within a few rods of the engine house, where this machine stands at night, so that they can all be called by the company's watchman, within a few minutes after an alarm of fire is given, and if a dispatch is received of a fire up the line, this machine and men can be on their way to it within ten minutes after the receipt of such dispatch, if in day time, and 15 or 20 at the farthest if in the night.

"In addition to the usual pump of the locomotive, a Giffard Injector, an independent steam, or as it is sometimes called, Donkey Pump, is attached, to supply the locomotive boiler with water, while standing in the engine house at night, or when the fire engine is in operation at a fire."



WILLIAMS'S COMBINATION OF FIRE ENGINES WITH LOCOMOTIVES.

The patent for this invention was granted April 22, 1862, and further information in relation to it may be obtained by addressing the inventor at Syracuse, or H. C. Silsby (to whom an interest in the invention has been assigned, and who manufactures the engines), at Island Works, Seneca Falls, N. Y.

THE *California Farmer*, of June 6th, says some twenty-five hundred pounds of silver bullion passed through Placerville, the week previous, from the silver mines of Washoe.

A SERIES of gigantic canals for irrigation and navigation are projected for India. The length of canals for irrigation will be 681 miles; for navigation 145 miles.

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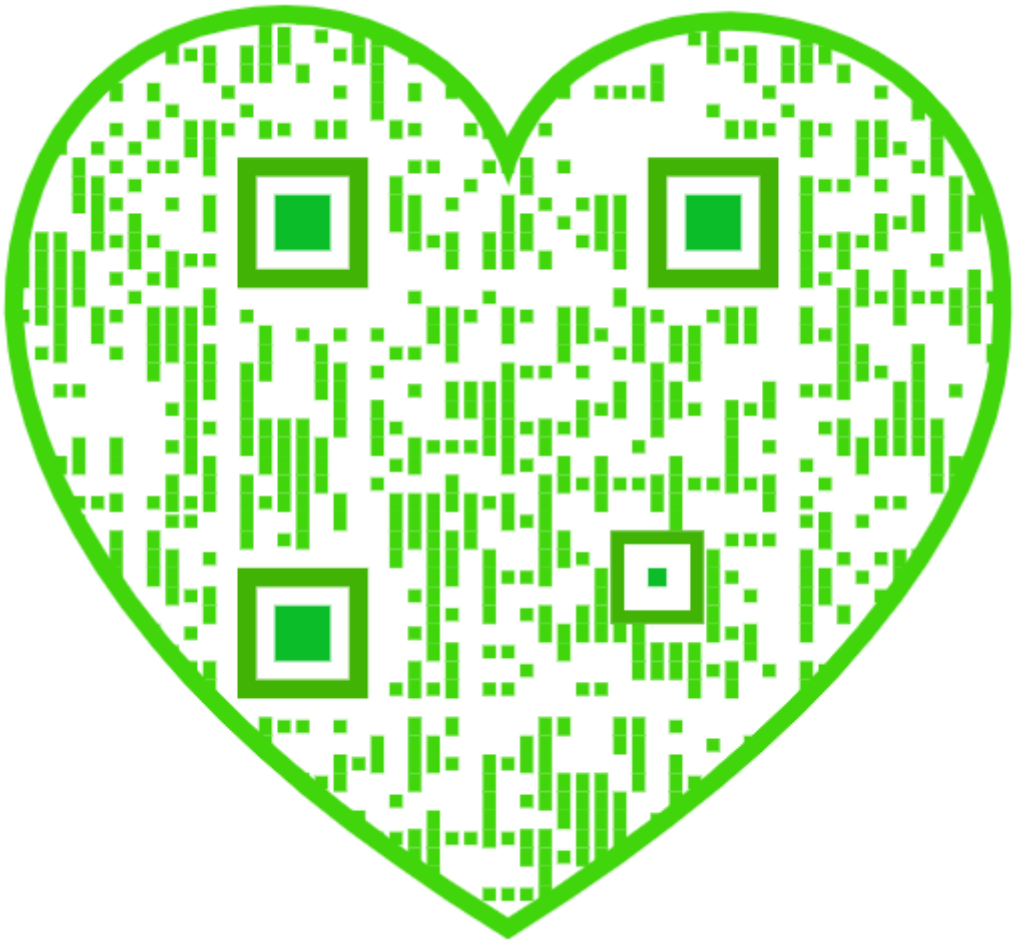

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE BATTLES BEFORE RICHMOND.

The events of the past week are large, and our space is small. We shall attempt no more than to give a comprehensive view of the operations, leaving the innumerable details to be gleaned from other sources. It seems that Jefferson Davis has been for several weeks concentrating the whole Southern army at Richmond. Long before the evacuation of Corinth a large portion of Beauregard's army arrived at Richmond, and forces were drawn to the same point from Charleston and other places. Some 200,000 men were thus collected, while McClellan's army had been reduced by sickness to about 95,000. The enemy hoped with his greatly superior force to fall upon McClellan's army and overwhelm it, but the latter had received notice of this intention and was making preparations to baffle it several days before the attack was ordered. The attack commenced on Thursday, June 26th, on that portion of our forces which were north of the Chickahominy, and was followed up on Friday, as we have already stated. Our account of these two battles, being from an eye witness, was substantially correct, but it seems that on Friday our forces did not hold their ground, but were forced back a short distance with the loss of several guns.

On the night of Friday, June 27th, our army crossed to the south side of the Chickahominy. The supplies which could not be moved were destroyed, the cars and engines loaded and blown up or run into the Chickahominy. The sick and wounded, too feeble to walk and not far from one thousand in number, were left at the hospitals, and Dr. Joseph S Smith with assistant surgeons, stewards and nurses were detailed to take care of them. Hospital stores and provisions were also left to supply their wants.

On Saturday morning June 28th, General McClellan found his whole army handsomely concentrated on the South side of the Chickahominy, and promptly organized it for its march over to its new base of operations on James River. The point selected was Turkey Island Bend, nearly due south and about ten miles distant in a straight line. The supply trains were sent in advance, preceded by a protecting corps. General Heintzelman's corps, consisting of Hooker's and Kearney's divisions, and General Smith's division of General Franklin's corps, were directed to protect the rear, while Colonel Averill, with the Third Pennsylvania cavalry and a battery of light artillery, maintained a position in the extreme rear. General Heintzelman took the Charles City road, General Smith the direct Oak Swamp road, and McCall was afterward placed on the extreme right.

The march lasted from Saturday Morning till Monday night, and was one continuous battle all the way. Though the bridges across the Chickahominy had been blown up by our Engineer corps, the enemy quickly constructed others for a passage of a portion of their troops, while the remainder by their knowledge of the country found fords through which they struggled, to follow our retiring columns. At the same time an immense army marched from Richmond down the south side of the Chickahominy, uniting with those who had crossed the stream, and hoping to overwhelm our forces. But the army was bravely and successfully defended by the rear guard. One method of defense was adopted all the way. Batteries were planted in commanding positions, and when the enemy arrived in close range, grape and canister were poured into his com act columns with terrible effect.

THE SATURDAY'S BATTLES.

One of the most desperate engagements took place on Saturday. The rear of our army had proceeded some two miles from the Chickahominy when they were overtaken and attacked by the advancing hosts. A furious onslaught was made on General Sedgwick's division of General Sumner's corps. The division all returned to the fight, and they were aided by Richardson's division. The fight raged fiercely for two hours, and the enemy were driven back over two miles. In this fight Gen. Meagher's Irish brigade made a desperate charge, capturing four of the enemy's guns and two regiments of infantry. The march was then resumed but the rear was constantly skirmishing with the enemy till night.

THE MARCH ON SUNDAY.

All through the Sabbath day our weary and half famished soldiers were toiling onward toward the James River, where they hoped for rest and security. No serious battle took place on this day, and there was not much skirmishing.

THE MARCHING AND FIGHTING ON MONDAY.

On Monday, June 30th, the enemy made a desperate attempt to surround and cut off the rear guard. Sending one powerful force to the right and another to the left and attacking at the same time in the rear. Generals Heintzelman and Smith in the center and the left received the enemy with such vigor that they repulsed the attack in that portion, but on the right General McCall was so completely overwhelmed, that though he fought literally with desperation, his whole division was destroyed with the exception of about 500, and he was himself wounded and taken prisoner. Darkness put an end to the contest, and this night the army reached the river.

THE GREAT BATTLE OF TUESDAY.

Though the army had reached the river, neither their marching nor fighting was yet over. General McClellan decided to continue down the stream a few miles to Harrison's Landing, a convenient point for receiving his supplies. As the enemy was still pressing forward in pursuit, extensive preparations were made to receive him. The command of the rear guard was assigned to General Fitz John Porter, who planted his batteries in successive tiers on the slopes of Malvern Hill, and awaited the onset. At about ten o'clock the enemy appeared. His lines swept round in a semicircle from James River on the left of our troops to their front. The divisions stretched one behind another as far as the eye could reach. Till about one o'clock the firing was confined mostly to the artillery, aided by the *Galena* and our other gun boats in the river; the infantry being held in reserve to drive back the enemy in case he should come so near as to threaten the capture of any of our guns. But the infantry found abundant need of their services. The enemy seemed determined to drive our forces from their position, and the rebel officers led up their men in the range of our batteries in utter recklessness. For a long time the sweep of our artillery broke and hurled back every charge, but the enemy outnumbered our army three to one, and the constant supplies of fresh troops finally brought all of our men to the work. The battle raged with fury till night put an end to the contest. Our lines were no where pierced, and the desperate assault was successfully repulsed.

THE WHOLE MOVEMENT.

Thus from Thursday morning, the 26th of June, till Tuesday night, the first of July, our army had been contending with two-fold odds, while engaged in one ot the most delicate and difficult of military maneuvers—changing the base of operations. We suffered a severe loss in life—though we inflicted a far greater one upon the enemy—but the movement was most successfully accomplished, and with a mere trifling loss of material. All of our siege guns were saved, and of our hundreds of field-guns we only lost 25, and those were lost in the heat of battle. The whole operation is creditable in the highest degree to the Commanding General, to all of his subordinates and especially to the rank and file of the army, who have been transformed so quickly from peaceable citizens into steady and disciplined soldiers.

The army is now resting securely on James River, near Harrison's Landing, in communication with Washington, whence supplies and reinforcements are being received, and under the secure protection of the gunboats which the enemy hold in so much dread. On the fourth of July General McClellan issued an address to his troops, in which he says that Richmond shall be entered by the army of the Potomac.

GEN. M'CLELLAN ADVANCING AGAIN.

By accounts from Fortress Monroe on the 6th of July, we learn that Gen. McClellan has advanced up the James River, seven miles above his position on the 4th. It seems too that Gen. Burnside was proceeding to reinforce McClellan, before the recent battles, when he was informed that McClellan was in Richmond, and believing the statement, Burnside returned to Newbern.

THE OPERATIONS AT VICKSBURG.

The bombardment of Vicksburg continued at last accounts, and it was said that Gen. Butler had 5,000 negroes employed in cutting a channel across the bend on which Vicksburg is situated, by which operation the river would be removed some seven miles from the city.

Muscular Labor versus Grain Elevators.

In this city, where large shipments of grain are made to Europe, a great number of laborers have been employed to lift the grain from canal boats and stow it on board of ships. Profiting by the experience of Chicago, Buffalo and Albany, where grain elevators, operated by steam engines, have been so successfully employed as a substitute for severe manual labor, the grain merchants and shippers of New York introduced two grain elevators last year, and five more this year, making seven altogether. These elevators now perform about two-thirds the work for which about 2,000 *strikers*, *shovelers* and *trimmers* were formerly required. These laborers feeling aggrieved by such machine competition have formed a protective society, and its members have resolved not to work for those shippers who use elevators. The grain shovelers, whose labors are still required in stowing grain, have lately refused to work, and they have held meetings to discountenance the use of elevators. On the other hand, the grain shippers have also concluded that they cannot dispense with elevators, and that they will not be dictated to by the shovelers.

All the experience of the past goes to prove that no combination of laborers or mechanics can successfully resist the introduction of labor-saving machinery, and that it is most unwise to attempt it. The first introduction of any machine, to supersede manual labor, generally affects the interests of those operatives who had been engaged in formerly executing the same labor by hand. But this amounts to a mere temporary derangemant of work, and the total result is a general benefit to all; and so it will be with the grain elevators in New York.

Quartz Crushing and Amalgamating Gold.

The Esmeralda California *Star* gives the following description of operating gold quartz at the Pioneer Mills in Esmeralda:—

This mill is run by steam power, using a rotary battery and running eight stamps; its capacity with double screens on is to crush four and a-half tuns per day; without screens, it can crush from five to six. The rock while being crushed is fed with hot water which causes the amalgamation to work more readily. The pumice passes off through a spout into what are called Howland's amalgamating pans; thence into an arastra, and from thence into a precipitating or amalgamating vat, and is then conducted into what are called Varney pans; which act as mullers, and grind the pumice down to a perfect pulp when the final amalgamation is completed; this pulp is now greatly reduced by water, and is carried off by a spout and flows over blankets; these latter catch and retain the sulphurets and the finer particles of metal which the amalgamators fail to gather; the blankets are then washed by hand, and the sediment is reduced by what is termed the "Hatch process," which is extensively used at Virginia and Gold Hill.

This mill is now crushing rock from the "Wide West" ledge, the owners having a contract to crush 1,000 tuns. From a crushing of twenty-seven tuns of rock from this lode, a sum of $3,126 83 or an average of $115 80 per tun was realized; this was independent of the blanket washings which would increase the returns to a fraction more.

Agriculturists' Wages in Great Britan and Ireland.

The subject of wages is of much interest to all classes. A paper was lately read before the Statistical Society, in London, by Mr. F. Purdy, in which he gave an account of the wages paid to agricultural laborers in the three kingdoms. He stated that men's wages in England and Wales averaged 11s. 6d., weekly; in Scotland, 12s. 9.; and in Ireland, 7s. 1d. That in 23 years the rise in the English wages had only been 12 per cent, but that in Scotland, at an interval of twenty years, the rise was 42½ per cent, and in Ireland over 57 per cent. The fact of the low rate of increase in England, as compared with Scotland, was dwelt upon. It was strenuously maintained that "English wages were kept down by two causes, viz., the cruel and impolitic settlement

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of lands, and the large expenditure for out door relief.

A shilling sterling is equal to about 24 cents. Two important facts are also elicited by these statistics. First, that wages have advanced in the above-named countries with the extended use of improved machinery. Second, that the most intelligent agricultural laborers are paid the highest wages. Thus in England, Scotland and Ireland steam-engines, reaping machines and improved machines have been very extensively introduced of late years; and in Scotland, where the agricultural laborer's wages are highest, the people generally are the most intelligent, owing to their system of common schools, which has been in existence for nearly three centuries.

Fire-Proof Safes—Clothing, &c.

We have recently devoted some attention to the protecting properties of fire-proof safes, and have assured our readers that too much reliance should not be placed upon them. When properly constructed they afford considerable resistance to the action of fire, but when exposed to great heat they will inevitably give way. Some sensitive safe makers undertook to kick up a row about the matter, but, upon reflection, concluded that discretion would be the better part of valor. In "Chambers' Encyclopedia of Useful Knowledge," now in course of publication, we find the following observations on this subject, which chime in admirably with our position :—

"The modern safe has double walls and doors of stout iron plates, and the space between the plates is filled with some substance that shall resist the transmission of the heat which would be readily conducted through solid iron. The materials used for these linings are very various--sand, dried clay, charcoal, ashes, bone dust, alum, gypsum, &c. The safes of Messrs. S. Mordan & Co., which are largely used by bankers, are lined with a mixture of equal parts of saw dust and alum. Some makers include small vessels containing liquids, the vessels burst when heated, and the liquids exert some cooling effect. Alum acts in nearly the same manner. It contains 24 equivalents of water, or nearly half its weight. At 212°, ten equivalents are driven off in vapor; at 248°, ten more; and at 392°, the four remaining equivalents are volatilised. It is a mistake, however, to suppose that any of these linings can render such a safe really fire proof; and this is admitted by the more scrupulous manufacturers, who carefully abstain from using the designation of 'fire proof,' but apply that of 'fire resisting,' which honestly describes all that they are capable of doing, as they may resist the action of fire for a considerable time; but whether or not their contents may be ultimately preserved from a fire, is simply a question of the duration and intensity of the heat to which they are exposed. Their great weight in some cases assists in preserving them, especially when on an upper floor, as such a safe would be the first thing to break through the burning joists and descend to the lower part of the building, where the fire is usually the most smothered. These safes are sometimes let into recesses of stout masonry, built on purpose, and protected by an additional iron door. This, of course, adds greatly to their security. All such safes should of course be secured by the best locks that can be made, protected by every possible precaution against picking, blowing up by gunpowder, or other violence."

The fire-proof safe needs to be improved, and we think it a good subject for the further development of ingenuity. There are many good safes now in the market, but not one of them can be relied upon as a perfect protection.

Fire Proofing.—Attempts have continually been made to render cotton, linen, and other textile fabrics, timber, &c., incombustible; but at preseut they have been but partially successful. There are many means by which fabrics may be prevented from flaming, their combustion being reduced to a slow smouldering; and the many recent cases of fatal results from the present extravagant dimensions of ladies' dresses have rendered the adoption of some such protection against fire very desirable. By moistening the fabric with a solution of any saline substance, which, upon drying, will leave minute crystals deposited in or between the fibers, its inflammability will be greatly diminished, but the salt imparts a degree of harshness to the fabric, and in many cases weakens the fibers. Alum, sulphate of zinc, and sulphate of soda have been used, and are effectual to prevent flaming, but they weaken the fiber. Common salt does the same. Phosphate and sulphate of ammonia are less objectionable on this account, but the former decomposes by contact with the hot iron in ironing. Tungstate of soda has been proposed, and is said to have no injurious effect on the fiber. Sulphate of ammonia, chloride of ammonium (sal ammoniac), and borax, are among the best fitted for domestic use, though they are not unobjectionable. For made-up clothing, borax is, perhaps, the best, as it is most effectual in its action, and is the least injurious to the appearance of the article, though it is stated to have some weakening effect on the fiber; this, however, is only perceptible in case of a tearing strain, and will not perceptibly damage such articles as ladies' underclothing, or anything else only subject to ordinary wear. Wood has been treated in a similar manner. Milk of lime, alum, sal ammoniac, sulphate of ammonia, chloride and sulphate of zinc, sulphuret of lime and baryta, &c., have been used, and its inflammability but not its combustibility, is destroyed. Like the fabrics, when similarly treated, wood smoulders slowly. The most efficient protection to wood is silicate of soda. If planks of moderate thickness be brushed three or four times over on each side, with a strong solution, they are rendered almost incombustible; they will only burn when very intensely heated. The silicate fuses and forms a glass which envelopes the surface, and even the internal fibers of the wood, if it be sufficiently saturated, and thus seals it from the oxygen of the air.

Pulling Flax.

We have been given to understand that a far greater amount of land than usual has been sown with flax, in expectation of a great demand for it, to be used for manufacturing purposes. We believe there will be such a demand for it, but the profit to the farmer will depend much upon the manner he harvests and takes care of his crop. We will, therefore, give some practical information on this subject. The flax plant is of rapid growth, and it usually commences to flower within two months after its green spears first appear above the ground. It is generally agreed that the fiber is in the highest condition for manufacturing purposes before the seed becomes quite ripe.

But a small quantity of seed can be obtained from the flax that is designed for the finest fiber. When both seed and fiber are required, which will generally be the case with our farmers, the flax should stand until the seed has become plump and shiny. The fiber of ripe flax is not so fine and strong as that of partial green flax, still it is the very kind which may be used for most coarse fabrics, either to mix with cotton or for making mixed linen and woolen cloth.

In Belgium, where fine flax culture has long been practised with distinguished success, a full-grown plant is selected, and the best-matured and ripest capsule is taken. This is cut across with a sharp knife, and the section of the seeds examined. If they have become firm inside, and the outside has assumed a good deep green color, the plant is considered fit for immediate pulling. At this time the entire plant will exhibit signs of its approaching maturity, the bottom of the stalk will be seen to have assumed a yellowish tint, and have become much harder to the touch than it was before—good indications of an interruption to the circulation of the juices of the plant. If this altered condition be allowed to go on by the plant remaining in the ground, the change of color will rapidly make its way up the stem until it reaches the capsules, and then the seeds will be found to be fully matured, quite hard, and to have assumed the dark color with which we are so familiar in the market samples. The next stage of the plant would be the bursting of the seed vessels and disjection of their contents, but to preserve both seed and fiber, the plant should be harvested at the earlier stage, at which time the fiber is at its best condition. If left until the seeds are quite matured, the stems get hard and woody, and the fiber is apt to get much broken in the subsequent process of separation. Long experience has proved that this is the most profitable time to pull flax.

In order to get the greatest length of fiber, which is a matter of great importance, flax is pulled up by the roots. "The flax is pulled by hand, each singly grasping a small handful carefully by the neck, just below the seed vessels, and drawing it up out of the soil, and laying it in rows across one another. These are allowed to remain lying open on the ground for a certain time, generally one or two days; they are then collected together, and bound into small-sized sheaves or bundles, care being taken that the band shall be placed just under the seed heads of the plant, and the bottoms or butts left unconfined and open. If the crop has been irregular in its growth, and the stems are of unequal lengths, it is desirable, as far as it can be managed, to pull them in different bundles, according to their length, as both in steeping and scutching much fiber is otherwise lost. It is also desirable, in binding them, that the butts should be gently pressed on the ground, in order to regulate the length of the different stems. After the sheaves, or "bundles," as they are termed, are bound, they are arranged in small stooks, usually of four, five or six each, placed in a circle, the butts being well spread out, so as to admit the air freely to their centers—the weather, and the condition of the crop when pulled, of course regulating the period they have to remain on the field."

In the Durango lead mine near Dubuque, Iowa, about 12,000,000 lbs. of ore are now exposed in an open lode, ready to be mined.

Polytechnic College of Pennsylvania.

The ninth annual commencement of this institution was held June 26, at Concert Hall, Philadelphia. A large audience was in attendance.

Soon after eight o'clock, the graduates marched into the room and took possession of the front settees, while the invited guests and the faculty occupied seats upon the platform, which was graced with the American flag.

The exercises were opened with an eloquent prayer by the Rev. Mr. Clark, after which a fine band performed a number of operatic selections.

Hon. Thomas H. Burrowes, LL. D., Superintendent of Instruction of the State of Pennsylvania, now addressed the meeting. He spoke of the great want of practical education; there was too much theory and book learning given, and many parents wanted their children to learn that which would bring in money at once. We should so learn all that we do learn that we may understand it, and apply it to the great uses of life; and this, he was glad, had begun to be the system of instruction, and was followed out in the Polytechnic College of the city of Philadelphia.

The list of graduates, with their residences and the subject of thesis of each graduate, is as follows :

Degree of Bachelor of Mechanical Engineering.—William C. Gatzmer, Tacony, Pa.—Subject of thesis : Motion of Steam.

Edward I. H. Howell, Germantown, Pa.—Subject of thesis : The Sewing Machine, Past, Present and Future.

Jerome Keeley, Phœnixville, Pa.—Subject of thesis: Steam Boilers.

Degree of Bachelor of Chemistry.—Campbell Tucker, Philadelphia.—Subject of thesis : Manufacture, Properties and Uses of Soda, its Chlorides, Sulphate and Carbonate.

Degree of Bachelor of Mining Engineering.—Henry R. Clark, Trenton, N. J.—Subject of thesis : Zinc and its Metallurgy.

John Jungerich, Darby, Pa.—Subject of thesis : Copper and Copper Smelting.

Degree of Bachelor of Civil Engineering.—W. G. Neilson, Philadelphia.—Subject of thesis : Tunnelling.

Abner C. Thomas, Philadelphia.—Subject of thesis: Lime Mortar and Calcareous Cements.

James A. Barton, Trenton, N. J.—Subject of thesis: The Theory and Principles of Construction of the Most Economical Wooden Bridges.

Henry N. Harrison, Holmesburg, Pa.—Subject of thesis : Irrigation.

John ap J. Childs, Philadelphia.—Subject of thesis: The Common Roads.

Charles H. Blackwell, Hopewell, N. J.—Subject of thesis : Manufacture of Illuminating Gas.

James R. Maxwell, Newark, Del.—Subject of thesis : Water Works and Their Construction.

George A. Vaillant, Philadelphia.—Subject of thesis: Stone Bridges.

Frog Hunting.

The Auburn N. Y. *Advertiser* says that the catching of frogs at Montezuma, has become quite a considerable trade. It adds :—"For three or four seasons past two men have made the impaling of frogs their business. Every other day they ship from Auburn a barrel of frogs for the New York or Buffalo market. They make very handsome wages. The method of securing these *basso profundos* of the marshes is very similar to spearing for fish. The men paddle off through the marsh in the night with a dark lantern. They approach the haunt of the frog very quietly, and when near enough throw their dart with a certainty acquired by practice, always hitting them back of the head, killing them instantly. The hind quarters are then carefully skinned and cut off, packed in barrels and sent to their destination. They generally secure two or three hundred in a night, and are paid $6 a hundred.

The Syracuse *Journal* says the Salt Company are now shipping more than 20,000 barrels of salt per week, and that this does not nearly supply the demand; but the pressure is now being relieved. Nearly a million and a half of bushels of salt have now been inspected and shipped, and the production is increasing. The dry weather has been very favorable to saline fields.

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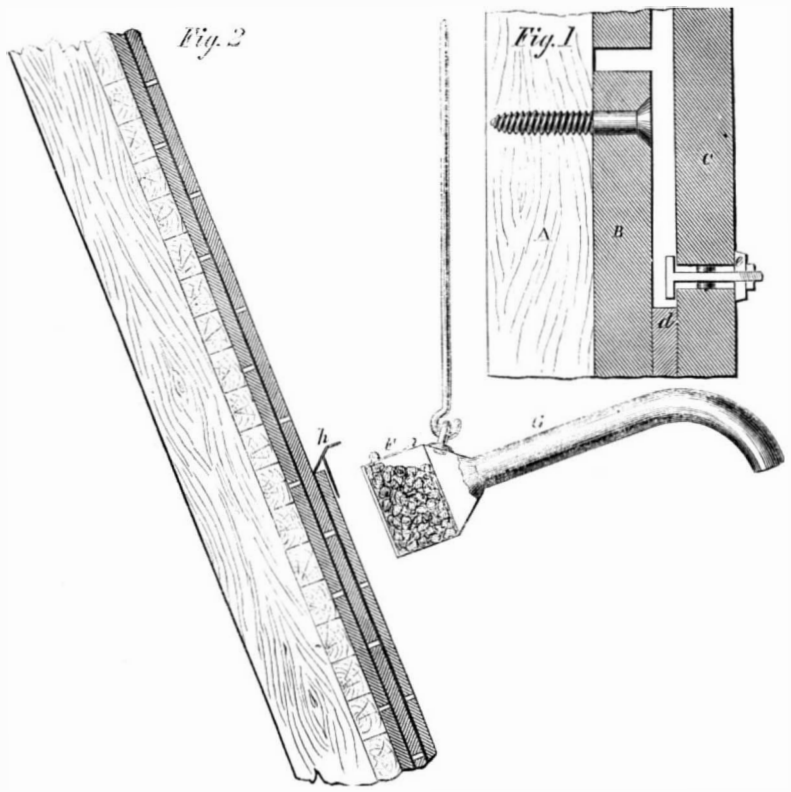
New Mode of Securing Armor Plates.

The principal difficulty in the construction of iron-plated ships is the securing of the plates to the vessel's side. Those only who are accustomed to handling iron can form any conception of the tremendous strain exerted by a plate 15 feet long, 3 feet wide and 4½ inches thick, as the ship to which it is attached is rolled and tossed about in a tempestuous sea. If the plates are bolted to the ship's side the bolts must be large and numerous, and the holes to receive them very seriously diminish the strength of the plate. It is found that when plates are broken by cannon shot, the fracture generally commences at the bolt holes, and a great deal of study has been devoted to the effort to devise some mode of securing plates without piercing them through with these weakening holes.

The annexed engraving illustrates a plan for soldering thin plates one upon another, the inner stratum only to be pierced for bolt holes. The plates are first tinned on the surface, the inner layer is secured to the ship's side by screws, and then the other layers are soldered upon the outside in succession until the desired thickness is formed.

In Fig. 1 A is the wall of the vessel, B the inner plate, and C the second plate, in position to receive the solder, which is melted and poured in between the two. The space between the two plates is closed at its lower edge by a strip of fusible metal, *d*, and the space between the end of the plate, C, and the adjoining plate in the same layer is closed at its outer edge by a slat, *e*, of wood or iron secured in place by a T-headed bolt.

Before the solder is poured into the space between the plates, the outer plate is heated by a swinging furnace, which is represented in section in Fig. 2. The furnace, F, is of equal length with one of the plates, and is supplied with air through the flexible hose, G. A trough, *h*, of sheet iron guides the molten metal into its place.



SHAW'S MODE OF SECURING ARMOR PLATES.

It is claimed that this mode of securing armor plates, besides its great strength, cheapness and ease of fashioning to the vessel's form, renders the vessel water tight.

The author of this invention is Thomas Shaw, who assigned it to himself and Philip S. Justice. The patent was issued to the two jointly, May 13, 1862, and further information in relation to it may be obtained by addressing either of the patentees at No. 21 North Fifth street, Philadelphia, Pa.

Defects in the "Monitor" and "Galena."

From an officer on board the *Monitor* we have received a letter from which we take the following extracts:—

The present hot weather is making apparent some of the defects of our vessel. The principal one is the want of sufficient ventilation. It was supposed that the air forced into the engine room, taken under the floors and admitted by means of registers into different parts of the vessel, would be sufficient, but it does not prove to be so. As long as the weather was cool it was well enough, but as soon as hot weather came on we found that the air in its passage through the fire room (where the thermometer ranges from 130° to 140°) becomes heated. The galley, if you remember, is in the fire room just behind the boilers, consequently the smoke, gas and effluvia arising from our culinary operations mingle with the current of heated air from the fire room and give it an additional stench from the bilge water, as it passes under the floor of the vessel, before we get it for ventilating purposes.

But it is with decklights and hatches closed, as in action, that we experience the greatest want of a pure wholesome atmosphere and a more perfect ventilation. The draught at such a time, what little there is, is upward through the turret, which forms a sort of chimney for carrying off the noxious gases from below, so that the gunners therein, whose labors are severe, inhale the air that has not only taken the route I have just described, but has been deprived of nearly all its oxygen by passing through nearly forty pair of lungs on the berth deck, before reaching them. All on board suffered severely from this cause in our late fight with the Richmond batteries.

Again we find that the pilot house is in the wrong place, as it prevents the boat from being fought head on, which is her best position, as her side armor and all that portion of her aft the turret, would be much better protected.

We find, too, that our guns cannot be fired aft over the smoke hatches without endangering the boilers. This would suggest the expediency of having but one opening in the deck from the furnaces, which arrangement would allow the guns to be trained further aft.

The ports do not allow of sufficient elevation, only 5°.

All of these defects, with many smaller ones which exist, will be remedied, I am told, in the new vessels now building.

The severest blow we have yet received on the turret was at Fort Darling. It was from a solid ten-inch shot fired with a very heavy charge of powder from a distance of about 800 yards. It struck the turret very nearly perpendicular with its side, making an indentation of 3¼ inches, but without any visible fracture of the plates. On the inside, opposite the indentation, the plates were somewhat fractured.

The iron-clad *Galena* was severely handled in this fight, the fire from the batteries being mostly concentrated upon her on finding that their shot were penetrating her sides. I am not positive that any shot passed entirely through both sides, but I saw where a ten-inch shot had gone through her port quarter, where her plating is 2½ inches thick with six inches of wood backing, and after passing over her gun deck had gone through the wood backing on the starboard quarter and crowded off the iron plating. Shells penetrated her side where it was of the thickness I have stated above, and exploded on her gun deck, making terrible havoc among her crew. In two or three places where her spar deck was struck by ricochet shot, the entire substance of the deck, both wood and iron, for the distance of three feet and the width of the shot, was scooped out, leaving a clear opening through to the space below. This deck, however, is ridiculously light, being made of two-inch plank covered with two ¼-inch iron plates. As far as resistance to shot is concerned she is a miserable failure.

No less than 200,000 gallons of pickled cucumbers were put up in San Francisco in 1861.

The Northern Pacific Railroad.

A bill has passed the Senate for the construction of a Northern Pacific Railroad, and it will, in all probability also pass the House of Representatives.

The bill grants land but no United States bonds to the Company for its construction. The route was surveyed by Gen. Isaac Stevens (now at Beaufort, S. C.) This road is intended as an addition to the great Central line which had previously been authorized. The President of the United States is empowered to appoint three engineers, who shall immediately proceed to survey a route from Superior City, on Lake Superior, to a point on the western boundary of Minnesota, and thence to the Pacific by way of Columbia river, with a branch to Puget's Sound. Provision is made for a suitable connection with other roads is Minnesota. To aid in its construction the government donates to the States and Territories, through which it shall pass, every alternate section of the lands on each side of the road for twenty miles. Mineral districts are exempted, but an equivalent amount of agricultural lands is granted in place of these. In disposing of this estate the price to purchasers within ten miles of the line is limited to $2 50, and for the residue at $1 25 per acre.

In distributing the lands one half of them are to be donated to the States or Territories, as fast as successive sections of twenty-five miles of road are completed. But as the work of crossing the mountains must be very difficult and expensive, it is provided that the remaining half of the lands shall not be given away until the completion of the road, when it is to be donated to the States and Territories in proportion to the expenditure in building the whole road.

One of the sections of the bill provides for extending the road southwestwardly from Superior City to some point on the Wisconsin river, not further South than Grand Rapids, and thence to the valley of Fox River, on condition of allowing other roads to form running connections with this on fair and equal terms.

Hydrophobia and Muzzling Dogs.

In the hope of checking the prevalence of hydrophobia in France, a tax on dogs was imposed in 1855. The number of these animals did not, however, diminish much, their average number in Paris being about 60,000; and so far from that of the cases of hydrophobia having decreased, they have not been so numerous during twenty years as for the last three years. The most effectual means of preventing dogs biting, and thereby communicating the disease, seems to be muzzling them; and M. Renault, the distinguished veterinarian, in a communication to the Academy of Sciences, states that the assertion that muzzling dogs, by the constraint it produces, is itself a cause of rabies, is utterly unsupported by any well-established facts. On the other hand, he points out the results which have been obtained in Berlin from a general and permanent muzzling of all dogs not tied up at home. A tax had already been imposed with no diminution of the number of cases of hydrophobia, when in 1854 the muzzling was ordered and strictly executed upon all dogs not tied up. From the year 1845 to 1853 inclusive, 278 cases of rabies (nearly twenty per annum), were verified at the Berlin Veterinary School; while from 1854 to 1861 inclusive, only nine cases have occured, and none of these since 1856. The conclusions which M. Renault draws from these facts are, that spontaneous rabies is of very rare occurrence, and that permanent and general muzzling of dogs is a highly efficacious means of preventing the propagation of the disease.

Nickel cents that a while ago sold at 3 per cent discount now sell at one per cent premium. People who a while ago could not think of carrying them are now glad to get them to carry.

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PETROLEUM—ITS SOURCES—VARIOUS THEORIES.

Number II.

Different opinions exist respecting the source of petroleum. Prof. Silliman states that it is of vegetable origin, and was produced by the agency of subterranean heat. This is a very general but unsatisfactory opinion. Geologists most generally believe it to be derived from bituminous shales situated below the coal formations. It is commonly found in the American rocks called the Portage and Chemung Group. This group of rocks is of immense thickness on some parts of our continent, being no less than 4,900 feet thick in Michigan. The bituminous shales called Utica Slates have yielded large quantities of oil in Canada by distillation, and the spouting petroleum wells of Enniskillen are in this formation. But petroleum is not always found in this class of rocks, as no oil has been found in various parts of New York State, where these rocks have been bored to a great depth.

Many practical men in the Alleghany and Ohio valleys believe that petroleum has its origin in coal beds. They assert that a low heat in the coal seams drives off hydrocarbon vapor, which is condensed in the pores of the rocks and the soil, and is washed by rains into subterranean recesses, situated at various depths in the rocky strata. Coal is found in all the hills adjacent to the petroleum wells in Pennsylvania, Ohio and Virginia. Cannel coal is abundant in the hills within one mile of Oil Creek, Pa. Is it not reasonable to suppose that reservoirs of petroleum must be situated at a considerable hight above the level of the ground where all the overflowing wells are pouring out their oily fluids? In all artesian wells the water rises to the hight of the fountain head, and the same law must prevail in petroleum wells. May not the reservoirs of the petroleum spouting wells be situated far above the level of the rocks where the oil is tapped in boring? The proprietor of a petroleum well near Parkersburg, Va., has assured us that the oil obtained in his well is of the very same character as that derived from the coal in its vicinity by distillation. It is a heavy oil, more unctuous than the common petroleum of Pennsylvania, and it is chiefly used for lubricating machinery. It is well known that oil of different qualities is obtained from different coal beds, and the petroleum of the United States differs in several characteristics from that of Canada.

Facts would appear to favor the theory that petroleum wells have two sources of supply, namely, coal beds and bituminous shales. In western Pennsylvania, Ohio, Michigan, Virginia and Kentucky, petroleum is usually found in the vicinity of coal seams, and it was a petroleum well in England, situated close to a coal bed, which suggested to James Young the idea of distilling coal at a low heat and obtaining oil therefrom. The commercial success of his efforts led to the very extended use of such oil, and finally to the very general application of petroleum for light.

This much may be accepted in favor of coal beds in certain localities being the sources of petroleum. On the other hand petroleum wells are found in Italy, Sicily, Syria, the Crimea, Persia, Siberia and Canada, very far removed from coal beds, but where there are bituminous shales, and this kind of petroleum differs frequently in several essential features from that which is found in coal regions. The Canadian crude petroleum far surpasses that of Pennsylvania for concentrated stench, and we can easily credit it with a lower, older and different origin.

Geologists who adhere to the idea that bituminous shales are exclusively the source of petroleum will be pleased to make a distinction between the source of the decent, clear oil obtained at Smith's Ferry, on the Ohio river, and that found north of the upper lakes. But whatever may be the source of petroleum and whatever theory may be the most plausible, it must be admitted that we are unacquainted with most of the operations of nature in the interior of the earth. The most important question is, will not our present sources of petroleum soon become exhausted? In answer to this it may be stated that petroleum springs have been known, and the petroleum used to some extent, for thousands of years. Thus, in the island, of Zante, in the Mediterranean, there are two springs which have been open many thousand years, and the more rapidly the substance is removed from the wells, the more powerful and prolific the springs become. If this has been the case with the petroleum springs of Zante, may it not be so with those on our continent?

Petroleum, or rock oil, may not always be a proper name for this peculiar substance. It is found in swamps and peat bogs as well as rocky strata. In the swampy forests of Borneo the Dyoks collect petroleum from the surface of ponds, but all the flowing wells in America have been sunk to a considerable depth in rocky strata.

VALUABLE RECEIPTS.

Case Hardening Iron.—The hardness and polish of steel may be united, in a certain degree, with the firmness and cheapness of malleable iron; by case hardening, it is a superficial conversion of iron into steel.

The articles intended to be case hardened, being previously finished, with the exception of polishing, are stratified with animal carbon, and the box containing them luted with equal parts of sand and clay. They are then placed in the fire, and kept at a light red heat for half an hour, when the contents of the box are emptied into water. Delicate articles may be preserved by a saturated solution of common salt, with any vegetable mucilage, to give it a pulpy consistence. The animal carbon is nothing more than any animal matter, such as horns, hoofs, skins or leather, sufficiently burned to admit of being reduced to powder. The box is commonly made of iron, but the use of it, for occasional case hardening upon a small scale, may easily be dispensed with, as it will answer the same end to envelope the articles with the composition above directed to be used as a lute; dry it gradually before it is exposed to a red heat; otherwise it will probably crack. The depth of the steel induced by case hardening, will vary with the time the operation is continued.

A very speedy and most excellent method of case hardening, is effected by reducing some of the prussiate of potash to powder, and making it into paste, rubbing over the finished iron while it is at a red heat, and then putting it in the fire again, and plunging it into water when the iron is at a blood red heat. Another method consists in covering the polished iron with a paste of the prussiate of potash and flour, allowing it to dry, then placing it in a clear fire until it becomes red hot, when it is plunged into cold water. This may be repeated, to insure a greater depth of hardening.

Enamelling Cast-Iron Vessels.—Reduce into fine powder and grind together nine parts of red lead, six parts of flint glass, two parts of purified pearlash, two parts of purified saltpeter and one part of borax. This is put into a large crucible about half full and melted until a clear glass is obtained. This glass is then ground with water and the cast-iron vessel is covered with a coating of it and then heated in a muffle in a furnace. This will melt in a very short time if the furnace is at a good heat, and the cast-iron vessel will be covered with a very fine black enamel of a shining appearance. To make it tough, it should be put into an annealing oven.

Another very fine enamel for iron vessels is made as follows: Twelve parts of flint glass, four parts of pearlash, four parts of saltpeter, two parts of borax and three parts of the oxide of tin calcined with common salt. This is treated the same as described above and makes a white enamel.

The cast-iron articles to be enameled are scoured bright with sand and dilute sulphuric acid, then dried and the enamel paste put on with a brush, or poured on the surface, and the excess dripped off. This paste is dried slowly in the air, and the articles baked in a hot oven until the paste fuses. The heat is gradually raised to the melting point.

The *Desert News* states that a cotton mill has been built at Parowan, in that Territory, and that some of the machinery has been put up and is now running. A considerable quantity of cotton is now raised in southern Utah, and it is for its manufacture into cloth that this factory has been constructed.

The *Lake Superior Miner* states that the National Copper Mine, at Ontonagon, produced 51 tuns 1,375 lbs., during the month of May last.

Correspondence

OUR SPECIAL CORRESPONDENCE.

The Van Nest Gap Tunnel—The beauty of New Jersey Scenery—A Subterranean Tour and an Awful Report.

Oxford Furnace, N. J., June 15, 1862.

Messrs. Editors:—At 8 o'clock yesterday morning I left Jersey City, for a trip to this delightful region, to examine that great engineering work, the Van Nest Gap Tunnel, and to see some practical experiments with Wiestling's new blasting powder. Taking the cars of the New Jersey Central Railroad, I proceeded to Hampton Junction and thence by the Warren Railroad to this place. I have traveled all over the United States, from Maine to California, and from Michigan to Texas, and I know of no finer region than this portion of New Jersey through which I have just passed. Beginning quite level in the eastern portion, it gradually becomes more rolling, and in the Western part of the State the road winds among high hills and mountains. All the way the land is well cultivated, and the country shows that it is inhabited by an industrious, thrifty and prosperous people.

At this station I found Mr. Wiestling, the managing partner of the firm, who have cut the Van Nest Gap Tunnel, waiting for me with his carriage, and we were soon whirled up the side of the mountain to his head quarters at the work. The Warren Railroad is the New Jersey portion of the Delaware, Lackawana and Western Railroad, which was built for the purpose of bringing coal from the Lackawana mines in Pennsylvania to the New York Market. Near the western edge of New Jersey it passes over a chain of high hills, at the Van Nest Gap, and as it was desired to carry the road 165 feet below the surface, it was necessary to cut a tunnel. The contract for the tunnel was taken by McAlister and Wiestling, the former now a Colonel in the army, and the latter a young civil engineer, who has had the principal charge of the work.

After a good dinner, ending with a feast of delicious strawberries and cream, Mr. Wiestling and myself prepared for an inspection of the tunnel. You are probably aware that Philadelphians always call india rubber *gum*, and Mr. Wiestling arrayed me in a gum coat, gum boots and gum overalls; while he put on his dress, made expressly to wear in the tunnel. Riding down to the west end of the tunnel, the carriage was sent round to the eastern end to take us home, when we should emerge. Mr. Wiestling lighted the miners' lamp on the front of his hat, and wading in the shallow water between the high sides of the open cut, we passed beneath the rocky arch into the darkness of the tunnel. There is a short curve at the west end, and as soon as we had passed this, we saw far before us lights dancing about, and heard the click of hammers from the workmen who were giving the finishing blows to their labor of eight years. At the same time we could see a glimmer of light coming through from the east end, and looking back, the vapor about the mouth of the tunnel was illuminated with a soft radiance by the declining sun; the whole forming an impressive and novel scene.

The whole tunnel is cut through scienitic granite, but while the rock in the east half is exceedingly hard and solid, that in the west half is in process of disintegration; making it necessary to protect this portion by an arch of masonry. Springs of water are oozing through cracks and seams in the rock, keeping the tunnel constantly wet, and down one of the shafts a stream is pouring as large as a man's arm. It has been not only a great, but a very damp and dirty job. The excavation is now completed, and besides the workmen employed on the masonry arch, only one gang is at work, and they are cutting a support for an arch which is to be turned in one of the shafts to prevent any thing from falling down the shaft into the tunnel. We climbed up the long ladder to the platform on which this gang were at work. They are all English miners, and each one had a miner's lamp hung on the front of his hat. They were busy drilling holes in the rock for blasting out

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a skew back, as it is technically called, on each side, to receive the foot of the arch.

Coming down from the dripping platform, we waded along a little nearer the eastern end, where Mr. Wiestling had caused a number of holes to be drilled in the rock to show me the operation of his newly invented powder. Workmen were ready to load the holes, the charge was thoroughly tamped, and we went onward a few yards to be out of reach of the flying fragments. The match was applied, and after a minute's suspense the explosion came. It is possible that Sir Walter Scott might have given some idea of that report, but it is beyond the descriptive power of my pen. I never heard the Crack of Doom, though I have listened to Ralph Waldo Emerson talking about it in his clear tenor, but I imagine if ever I do hear it, it will bear a close resemblance to the firing of a blast in a railway tunnel. I first felt myself moved sideways about two feet, and at the same instant my ears were crushed and my whole frame was enveloped and shaken by a power of sound more tremendous than anything of which I had ever formed any conception. Then followed the reverberations, more penetrating and overwhelming than those of thunder, or any other echoes ever heard by mortal ears. The awful operation was repeated half a dozen times, and it was to me a new experience which I shall not soon forget.

The Van Nest Gap Tunnel is 3,020 feet long, 26 feet wide in the clear, and 20½ feet high. These are the finished dimensions, and in that portion of the tunnel which is arched the excavation of course had to be much larger. In the progress of the work three shafts were sunk, one 75 feet deep, one 165, and the other 110. At each shaft a steam engine was employed to pump out the water, and raise the rock. The work was commenced in 1854, and has cost about half a million of dollars.

The experiments with Wiestling's powder were perfectly successful, as has already been stated in the Scientific American. One of the holes chanced to be crossed by an obscure seam, and in this case the powder blew out through the seam, but where the rock was solid the effect seemed to equal that produced by gun powder; showing the harmlessness of the new powder when not confined, and its effectiveness when thoroughly inclosed. B.

A Fatal Boiler Explosion.

Messrs. Editors:—I yesterday visited the scene of the late boiler explosion of the iron works of Lazell, Perkins & Co., in Bridgewater, Mass., by which six persons were instantly killed, one mortally wounded and many others more or less injured. The boiler was located in the forge shop directly over one of the forge fires and by which it was heated. It was used in connection with another boiler, principally to drive a large steam hammer. It was a horizontal flue boiler 24 feet in length by 4 feet in diameter, with two 15-inch flues. It had been in use but about three years, and was considered as good as any boiler in the works. The force of the explosion was such that the entire end of the large forge shop, together with a greater portion of the roof of that wing was totally demolished. A piece of the boiler, containing 40 or 50 square feet, was lodged in a grove 50 or 60 rods distance, and near the same place was an iron rod 30 or 40 feet long, twisted in among the tree tops like a grape vine. The boiler was ripped and torn in every direction, both at the joints and through the solid plate, as if it had been of paper, while the flues were collapsed for more than half their length as if they had been of sheet lead instead of strong iron. The boiler plate appeared to be of uniform good quality throughout. The only defect I could find was a bad weld in one of the stays, but which was not sufficient, in my opinion, to account for the explosion. It is evident that at the instant of explosion there was, from some cause, a tremendous development of elastic force, the boiler being rent and torn in strong and weak places indiscriminately. No simple over pressure of steam could effect this. Some have attempted to account for it by the decomposition of the steam and subsequent explosion of the hydrogen. But the steam could have been decomposed only at a temperature at least equal to that of red-hot iron, and the oxygen would unite with the iron and the free hydrogen could only explode when it found a combining equivalent of oxygen, which it could not do in the boiler.

From the best evidence I could obtain, and after a careful examination of the collapsed flues, I think this case can be satisfactorily explained without calling in any gas, electrical or any other unknown theory.

While the steam hammer was running, it was usual not to have the pump on the boiler as it deadened the steam. At the time of the explosion the hammer had just been stopped to give the iron a fresh heat. It is probable that while the hammer was running the water had gradually fallen below the upper parts of the flues The upper side of the flues being intensely heated, and consequently weakened, was crushed down, and the arch of the flue being destroyed, they very readily collapsed, and the act of collapsing plunged the red-hot iron under water, thus causing the sudden generation of steam sufficient to produce the effects described above. Stephen Moore.

Natick, Mass., June 26, 1862.

Is Petroleum Injurious to Health?

Messrs. Editors:—Will you allow me to suggest the expediency of an article in your valuable journal upon the elements of petroleum, and the oil produced from it, upon the health of those engaged in it. The whole business being new, and a large number of refineries having been located in and about cities, and in many places the people having imbibed the idea that the odor arising from these refineries is prejudicial to health, an article giving an analysis of the crude and refined oil, and showing the effect of refineries upon the public health would be both instructive and useful. And in this connection it may be proper for me to say, that throughout the entire oil regions of Pennsylvania and Canada, where some ten thousand people are constantly engaged, and some of them literally drenched in the fluid, a healthier set of men cannot be found in America. It is also a fact that those engaged in refineries are proverbially hale and hearty, and even among uneducated physicians, and especially the common people, who live in the vicinity of these works, a restless anxiety prevails lest their health will become unfavorably affected. This idea, it is true, is lessening, but still it prevails to a large extent. I understand that Dr. Jackson and other chemists of Massachusetts, have written upon the subject, but no publicity has been given to their writings. I hope it may engage your attention. It will require but a brief article to set the country right in the premises. B. Hughes.

[The inquiry into the effect of any substance on the health of a community is perhaps the most difficult investigation that has ever been undertaken. There are so many causes of disease that some of them are sure to come into the experiment and vary the results. Petroleum is composed of hydrogen and carbon, though it frequently contains sulphur and other impurities in very small proportions. We have no idea that it is injurious to health in any perceptible degree.—Eds.

Coal Oil as a Lubricator.

Messrs. Editors:—In connection with an article on lubricating oils, in a number of the Scientific American a few weeks since, I would remark that it will be to the interest of a great many of your readers to know that such an oil is manufactured in Cleveland, Ohio, (and probably in other establishments at the East) from the crude ground oil, after the kerosene has been extracted. I have used it on my engine and all other machinery for three years, and find that it surpasses all lard and other lubricating oils to be found in our best country stores, or, all that I was ever able to obtain, while it costs only 25 cents per gallon. I saw it used two years since on all the locomotives of the Michigan Central Railroad, and their cars, on a trip West. The engineer, with whom I conversed about the oil, objected to it only on account of its greenish dirty color. It is very slow and requires large discharge spouts. I surmise that it is not fit for cutting screws, but for bearings, &c., it equals the best oils that are called pure. This is a matter of real experience. H. Lampert.

Nunda, N. Y., June 24, 1862.

Worcester's Improvement in Pianos.

Messrs. Editors:—I beg permission to correct the wording of a sentence that appeared in your otherwise accurate description of my Hinged Plates for Pianofortes, printed and illustrated in your paper of this date, since a wrong impression is conveyed concerning an essential point in the invention. In the fifth paragraph of the article above named, you remark that "By this arrangement the vibration of the strings is imparted to the piece, *b*, prolonging the note," &c., &c. It should have read thus: "By this arrangement the vibration of the strings is imparted to that portion of the sounding board extending under the plate, or in other words to the entire sounding board." By hinging the plate I have merely freed the board and strings, the slight vibration or motion of the detached piece, *b*, (see engraving last week) aside from this fact is of no musical importance whatever, as a little reflection will show any one acquainted with the mechanism of the instrument. H. Worcester.

New York, July 5, 1862.

Varnishing Picture Frames.

Messrs. Editors:—I had occasion lately to varnish some picture frames of pine cones, acorns, &c., that would not bear brushing much, so I made the lac varnish very thin with alcohol, laid the frames on a board, and threw the varnish upon them from the brush, making them look nicely. E. I. A.

Steamboat Propelling Experiments.

A correspondent has sent us an account of some experiments made at Tidioute, Pa., to test a new system of propelling for flat boats of very light draft, to be used for towing on shallow rivers. It was tried on an old boat called by the new name, *Locomotive Steamboat Pioneer*. The driving wheel is like a cart wheel, 12 feet in diameter with projections on the tire. It is sustained by a frame composed of three sides of a parallelogram, the short side crossing forward of the bow, and the long sides reaching back each side of the boat to points directly in line with the engine shaft, and there held by bolts on which the frame can rise and fall. Two timbers, 18 inches apart, run forward from the front side of the frame to sustain the wheel. Such is the base of the frame. Posts, braces, rods and bolts complete it. The frame and wheel may then be raised and lowered past the bow of the boat in an arc of which the engine shaft and bolts are the center.

The driving power is then applied as follows: A rim of endless chain teeth 9 feet in diameter is bolted into one side of the spokes. Another endless chain wheel 16 inches in diameter is placed in line with this on the engine shaft. The chain does not pass direct from one of these wheels to the other, but over friction wheels in the top of posts rising from the frame at the bow. The engine shaft then operates the driving wheel and propels the boat.

This method of steamboat propulsion was patented by J. W. Wetmore, of Erie, Pa., in 1857. The boat has been tried for towing flat boats loaded with petroleum. She has towed three flat boats loaded with 227 barrels of oil, from Tidioute to Irvine, Pa., (14 miles), in about five hours. Each flat boat is about 75 feet long and 12 feet wide. The current in the severest rapids on the river is about ten miles an hour, and in the lower stages of the river can not be ascended by paddle-wheel boats at all. There are 16 projections on the tire of the driving wheel to prevent it from slipping. These are seven inches long, and made of chilled cast iron. The same boat failed as a stern-wheel propeller, as it required four horses besides her engines and wheel to bring her up the rapid current from Tidioute to Irvine.

In Chicago, an extensive iron-working establishment is now being erected by Messrs. Charles Kellogg & Co., of Detroit. These new iron works are to be devoted to manufacturing iron and railroad bridges, engines and machinery, and other iron work. and they expect to have the establishment in full blast in less than a year from the present time. They have just completed for Ward's Iron Rolling Mills, in Chicago, two immense Nasmyth steam hammers, each striking blows of 70 tuns, and under, as may be required.

The Boston *Commercial Bulletin* states that T. F. Wells, of that city, has completed a contract with the government to raise the vessels which have been sunk at the Gosport Navy Yard and in Hampton Roads. Altogether there were 13 vessels sunk. The contractor is to receive 45 per cent of the value of the vessels as salvage.

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EXPERIMENTS WITH COAL GAS.

The following extracts are from a communication of Dr. Frankland, F. R. S., to the *Journal of Gas Lighting* (London), on the above-named interesting topics :—

The temperature at which coal gas will ignite under ordinary, or extraordinary conditions, is a circumstance of considerable importance, both to manufacturers and consumers of gas. The difference of opinion which evidently prevails, even amongst those who are intimately acquainted with the properties of coal gas, proves that the subject has not hitherto received that attention which it obviously merits. Under these circumstances, the following experiments, and the conclusions drawn from them, although they are far from exhausting the subject, may not perhaps be altogether unacceptable as a contribution to this part of the history of coal gas.

The heterogeneous mixture of gases and vapors, known as coal gas, may, for our present purpose, be assumed to consist of :—

Olefiant gas and other luminiferous hydrocarbons.
Light carbureted hydrogen, or fire damp.
Hydrogen.
Carbonic oxide.
Bisulphide of carbon.

Now, as these constituents can, to some extent, become separated from each other, under certain circumstances, it is desirable, at the outset of the inquiry, to examine separately their respective igniting points.

1. Olefiant gas, which may be taken also as the type of the remaining luminiferous hydrocarbons, could not be inflamed by a hot iron, unless the latter were heated until it appeared of a cherry-red color in the day light of a tolerably well-lighted room.

2. The igniting point of light carbureted hydrogen was carefully determined by Davy. He says that, "light carbureted hydrogen can be inflamed by white hot sparkling iron, but not by iron at a red heat ; it is, therefore, much less inflammable than hydrogen or carbonic oxide, and less so than olefiant gas."

3. Hydrogen inflamed at a lower temperature than olefiant gas, but it could not be ignited by a rod of iron, unless the latter were heated to a temperature considerably beyond visible redness in a tolerably well-lighted room.

4. Carbonic oxide inflamed at a temperature somewhat greater than that at which hydrogen ignited, but lower than that necessary for the inflammation of olefiant gas.

5. Bisulphide of carbon vapor ignited at 300° Fah.

In some experiments recently made, Prof. Frankland had occasion to observe that when coal gas is allowed to mix with air contained in a space, partly inclosed, but still communicating freely with the atmosphere, such as an open gas main, there occurred an approximate separation of the lighter from the heavier constituents of the gas ; thus samples of the explosive mixture taken from such a space were found on analysis to contain olefiant gas, luminiferous hydrocarbons, carbonic oxide, and bisulphide of carbon, withbut a small per centage of light carbureted hydrogen, and mere traces of hydrogen, although the two latter gases constitute the chief bulk of coalgas. These gases must, therefore, have rapidly made their way out of the partially inclosed space into the atmosphere. This behavior of the different constituents of coal gas, when the latter is slowly admitted into one end of an open gas main containing atmospheric air, may not inaptly be compared to that of a number of birds, of different powers of flight, entering at one end of the pipe, and making the best of their way toward the opposite extremity. At every moment from the entrance of the birds, the per centage of those of swift flight would diminish near the entrance end of the pipe, while that of the birds of slower velocity would obviously increase in the same ratio.

The Master of the Mint, Prof. Thomas Graham, has proved that the rapidity with which gases diffuse into each other, or into a vacuum, is inversely proportional to the square roots of their specific gravities ; and, although there are some circumstances in the case of the open gas main, or partially inclosed space, which would somewhat interfere with this ratio, yet, for all practical purposes, Mr. Graham's law may be assumed to express correctly the different velocities with which the constituents of coal gas would hasten to escape from the space in question.

These velocities of diffusion are as follows :—

Bisulphide of carbon	1
Olefiant gas	1·66
Carbonic oxide	1·66
Light carbureted hydrogen	2·19
Hydrogen	6·23

All other luminiferous hydrocarbons existing in coal gas must have a diffusion velocity lower than that of olefiant gas.

Thus the effect of diffusion of coal gas in an open horizontal pipe, or other similar partially-inclosed space, would be to form an explosive mixture, containing chiefly hydrogen as the combustible gas, at o near the open extremity of the pipe ; while the explosive mixture, formed near the end of the pipe where the gas entered, would contain chiefly carbonic oxide, olefiant gas and bisulphide of carbon.

In order to ascertain the effect of the presence of a considerable per centage of bisulphide of carbon vapor upon the inflammability of the constituents of coal gas, and especially of carbonic oxide and olefiant gas, the following experiments were made.

6. Carbonic oxide was mixed with about 3 per cent of the vapor of bisulphide of carbon, and was then allowed to issue from a jet into the air. The jet of gas readily ignited on the approach of a glass tube containing oil heated to 410° Fah., the igniting point of the gas being probably not higher that 350° Fah.

7. Hydrogen, containing the same amount of bisulphide of carbon vapor, ignited by contact with a tube containing oil at 420° Fah.

Here, then, was a phenomenon which would seem to indicate the alarming possibility of the ignition, at a comparatively very moderate heat, of explosive mixtures of coal gas and air ; fortunately, the next experiments entirely allay any apprehensions on this score.

8. Olefiant gas, impregnated with 3 per cent of the vapor of bisulphide of carbon, did not inflame at a perceptibly lower temperature than when free from the admixture of the sulphur compound.

9. To the highly inflammable mixture of carbonic oxide and vapor of bisulphide of carbon, used in experiment No. 6, a minute trace (not 0·1 per cent) of olefiant gas was added ; instantly, the igniting point of the mixture was raised to that of pure carbonic oxide.

10. A similar experiment with the hydrogen mixture (No. 7), gave a corresponding result.

Thus, the extraordinary inflammability which is imparted to carbonic oxide and hydrogen by the vapor of bisulphide of carbon, is entirely removed by mere traces of olefiant gas ; and it is probable that the other luminiferous hydrocarbons contained in coal gas would produce the same effect. In order to complete this part of the inquiry, it now only remained to extend these experiments to coal gas itself.

11. Coal gas could not, even under the most favorable circumstances, be ignited at a temperature perceptibly below that described in experiment No. 4, as necessary for the inflammation of carbonic oxide.

12. When coal gas was mixed with 3 per cent of bisulphide of carbon vapor, its igniting point was not lowered in the slightest degree.

Having thus proved that any amount of diffusion can have but a very slight effect upon the inflammability of explosive mixtures of coal gas and air, the following experiments were made, to decide the disputed point, whether coal gas can be inflamed by sparks.

13. Hydrogen was readily inflamed by sparks struck from flint and steel.

14. Carbonic oxide was also readily ignited in a similar way.

15. The mixture of coal gas and air, issuing from a wire-gauze burner, was repeatedly and easily inflamed by the sparks struck from flint and steel.

These results are quite in conformity with the experience of gas engineers. Coal gas has been ignited from the sparks elicited by the contact of a workman's pickaxe with stones, the chipping of a pipe, &c. The notion that coal gas will not inflame under these circumstances has, doubtless, arisen from the impossibility of so igniting the gas of coal mines ; but the combustible gas existing in coal mines has been proved, by very numerous analyses to be light carbureted hydrogen only—no trace of hydrogen, carbonic oxide, or olefiant gas being ever present in it. Now, the igniting point of light carbureted hydrogen, is very much higher than that of the other combustible gases present in coal gas. A word of warning to the use of the safety lamp in gas works may perhaps not be here out of place. The Davy lamp was known, by its inventor, to be unsafe in certain conditions—as when placed in a strong draught or rapidly swung to and fro. Any degree of insecurity thus attaching to the safety lamp in mines is increased tenfold when it is used in explosive mixtures of coal gas, and hence it is highly desirable that the gauze of such lamps should be finer than that used in the miner's lamp, and also that the workmen should be stringently prohibited from placing the lamps in a draught of explosive gas, or swinging them to and fro, since the neglect of these precautions may easily cause disastrous explosions.

In conclusion, the results arrived at may be thus shortly summed up :—

1. Coal gas cannot, even under the most favorable circumstances, be inflamed at a temperature below that necessary to render iron very perceptibly red hot by daylight in a well lighted room. But this temperature is considerably below a red heat visible in the open air on a dull day.

2. This high igniting point of coal gas, under all circumstances, is due in a great measure to the presence of olefiant gas and luminiferous hydrocarbons.

3. The igniting point of explosive mixtures of the gas of coal mines is far higher than that of similar mixtures of coal gas ; consequently, degrees of heat, which are perfectly safe in coal mines, may ignite coal gas ; hence, also, the safety lamp is much less safe in coal gas than in fire damp.

4. Explosive mixtures of coal gas and air may be inflamed by sparks struck from metal or stone. Thus an explosion may arise from the blow of the tool of a workman against iron or stone, from the tramp of a horse upon pavement, &c.

5. Explosive mixtures of coal gas may also be ignited by a body of a comparatively low temperature, through the medium of a second body, whose igniting point is lower than that of coal gas. Thus sulphur, or substances containing sulphur, may be inflamed far below visible redness ; and the contact of iron below a red heat with very inflammable substances, such as cotton waste, may give rise to flame, which will then, of course, ignite the gaseous mixture.

We trust that some of our chemists will make experiments of the same character as the above with the vapor of petroleum, as several explosions have taken place in schooners containing this oil, and it has been proposed to us, that Davy lamps should be used in all vessels which carry petroleum, and in all refineries, and stores in which it is kept. We have no doubt but the Davy lamp will afford additional security to persons engaged in carrying and refining petroleum, but the directions given above must be carefully followed. The foregoing information should be disseminated throughout every corner of the civilized world.

A Land Battery.

Joseph Harvey, of Philadelphia, sends a plan for a portable land battery, to be rolled along with the troops, by means of a steam engine inside. He proposes to make an immense iron barrel, say 15 feet in diameter and the same in length, to hang a platform in it on an axle passing through the ends, and to suspend his steam engine below the platform, the guns resting upon the upper side of the platform and firing through embrasures made for the purpose. The engine is to turn a gear wheel, meshing into a circle of cogs running round the interior of the barrel, and thus to roll the battery along. Of course the thing could be transported only along roads. The inventor thinks that it would be very formidable to infantry and cavalry, and that it might be made of sufficient thickness to be invulnerable even to light artillery. The plan does not seem to us very promising of success.

ENAMELING IRON.—The notice that an article prepared for, and published on page 106, Vol. VI. SCIENTIFIC AMERICAN (new series), on the above-named subject, has been published by quite a number of our cotemporaries and credited to the London *Engineer*.

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VENTILATED RAILROAD CARS.

During warm and dry weather, railroad traveling is rendered exceedingly uncomfortable by the clouds of dust which come into the cars through the open windows. As the cars cannot be closed under the penalty of suffocation, a method of supplying them with fresh air, perfectly screened of dust, has become a great desideratum. If there is such a system of car ventilation known, and if it is perfectly practicable, it appears to us that it is not only the duty, but it would also be the best policy for all railroad companies to apply it to their cars. On the New York and Erie Railroad two car-ventilating systems have been applied and tested. The one is that of G. F. Foote, of Buffalo, N. Y., which is applied to two cars. An angular bonnet, covered with wire gauze, is situated on the top, and is connected with a passage at each side of the car, and with a fountain of water. When the car is in motion a current of air passes through the bonnet on the top, thence down the air passage at the sides, through a shower of spray—which removes all the dust from it—thence it passes up into the car through gratings situated along the middle of the floor. The fountain of water is sustained by a rotary pump connected with the axle of the truck.

There are also four or five cars on this railroad which are furnished with Mr. H. Ruttan's system of car ventilation. The air passes into the car through a fountain of water, thence down and out through the bottom, instead of coming in by the floor. The Michigan Central Railroad has applied this system to most of its passenger cars, and persons who have lately traveled on this road are unstinted in their praise of the comfort they enjoyed compared with their former experience in riding on the same road.

On the Hudson River Railroad the cars are made with double roofs, or, in other words, a portion of the roof for the whole length through the center of the car is elevated so as to admit of another set of registers through which a current of air can pass, and thus better ventilation is secured. This is a simple plan, yet not entirely effective in excluding the dust, but it answers a good purpose, and we understand that hereafter all the cars on this road are to be arranged on this plan.

On the New York and New Haven Railroad, which carries more passengers in proportion to its length than any other road running out of New York, no proper attention is paid to comfort in this respect. The cars are mostly of the old-fashioned kind with plain roofs and plain windows, having small registers placed above them, which serve at best but a poor purpose in admitting fresh air, and none at all in excluding dust. It seems to us that this Company is grossly inattentive to the comfort of those who so liberally patronize it. We frequently pass over this road, and, in warm weather, we share with our fellow passengers all the discomfort which its accommodation affords. The idea of the Company seems to be to get all it can out of the public, and to return just as little comfort or politeness as it is possible to bestow. It would do us good to catch an occasional smile on the face of the Superintendent and some of his attendants. At any rate we would be glad to get less dust and more comfort, and we could even afford to forego the smiles.

An Old Large-Hooped Gun.

A correspondent (A. S. Walbridge, of Malone, N. Y.,) informs us that cannon constructed with hoops shrunk over the tube or barrel, are of ancient origin. He states that there is one in the Castle of Edinburgh, Scotland, which was made in 1486, which has its center or barrel part formed of wrought-iron bars forged together, and these are hooped with iron bands shrunk on in a similar manner to the hoops of some guns that are now made in England and America and which have been supposed, by many persons, to be a recent invention. The old cannon in Edinburgh is 13 feet in length, and its bore is 18 inches in diameter. The thickness of metal at the muzzle is 4½ inches; the workmanship, as a piece of forging, is as good as any work executed at the present day, as it never was bored out, and yet the bore is so straight that it does not vary the eighth of an inch from end to end. It was used in war in 1491, but the bullets then were only granite spheres—the art of casting iron balls not being known. It is capable of taking in an iron ball of 796 lbs. weight, but it is not sufficiently strong to withstand the full charge of modern gunpowder with a solid iron shot, or even an iron shell. It is kept in Edinburgh as an object of curiosity.

IRWIN'S LAMP AND LANTERN.

There is no more important problem engaging the attention of mechanicians and men of science, than the production of a lamp that will burn rock oil absolutely without smoke, under all conditions. Our pages bear ample evidence of the great amount of effort which is being devoted to this task, and we aim to record every considerable step which is made toward its accomplishment. Petroleum may be burned for illuminating purposes in lamps, without any difficulty, so long as the lamps remain stationary, but some of the best of these lamps always begin to smoke

Fig. 1

Fig. 2.

when they are carried through the air, or when they are encountered by slight drafts. To obviate this difficulty is the object of the invention here illustrated.

The holes for the entrance of the air to feed the flame are surrounded by a cape, A, which extends some distance down the sides of the lamp, leaving a space between the cape and the lamp. Ribs, B B, are fastened upon the outside of the lamp, and extend under the cape to guide the air, which may be passing across the sides, directly into the holes, and thus prevent the cross currents, which produce the smoke.

Fig. 2 represents a lantern constructed on the same principle, to prevent unequal currents or puffs of air, as the lantern is moved up and down. The lamp, C, is surrounded by an external casing, *d*, with a space between for the passage of the air to feed the flame. The casing, *d*, is enlarged at the base, and the air passage is crossed by two diaphragms, one, *e*, perforated with holes, and the other, *f*, being merely a disk of metal extending pretty nearly across the base. This disk is connected with the external case by radial flanges which prevent the action of cross currents, while the two diaphragms effectually prevent the sudden puffs of air that cause the clouds of smoke in ordinary lanterns when they are moved quickly up or down.

These improvements were invented by J. H. Irwin, of Chicago, Ill. The patent for the lamp improvement was granted, through the Scientific American Patent Agency, May 6, 1862, and application for a patent for the lantern has been made. Further information in relation to either may be obtained by addressing J. F. Griffin, dealer in lamps, to whom one half interest in the inventions has been assigned, at Box 334, P. O., Chicago, Ills.

New Hampshire Manufactures.

The Manchester N. H. *Mirror* states, that the Manchester mills are running every spindle, and never made so many goods in the same time as during the last six months. They are now running 200 more looms than they did at this time last year.

For the six months ending the first of June 1862, they made 9,144,227 yards of delaines and print cloths, 26,000 dozen pairs of hose and 190,000 yards of cassimeres, and their monthly pay roll has averaged about $30,000.

The repairs and building of this corporation are unusually large at present. They are just completing an addition, 40 by 45 feet, 3 stories high, to No. 3 mill. They are also building a new store house, south and adjoining their present one south of Granite street, to be of the same style and hight. It will be 160 by 105 feet. For the print works of this company they are also going to build a new madder dye house, 66 by 150 feet, and a garancine house, 66 by 150 feet, both of brick. It will take about one million and a half of brick for these two buildings and the store house. The goods of the print works are in excellent demand.

The Amoskeag mills have stopped some of their spindles, owing to the high price of cotton. But the company which own these mills are also proprietors of the machine shop and armory. The latter gun establishment is nearly complete, and will be able to turn out 1,500 rifles a month, and will give employment to 200 machinists. They have a Government contract to make 10,000 rifles of the Springfield pattern.

They are making 500 breech-loading carbines, of the Linder Patent, for the Government. They have also built a steel breech-loading cannon, which is ordered by Russia as a sample.

Electrical Music.

Professor Gore, of London, states that visible vibrations accompanied with sounds of varying intensity are made by the passage of voltaic currents through a solution of cyanide of mercury and potash in dilute hydrocyanic acid, under which circumstances the mercurial connections, if of the requisite forms, are thrown into visible vibrations of varying rapidity, and emit sounds, the pitch of which varies with the vibrations.

It was found that when a small number of cells of a large size were employed, the vibrations were small and the sounds emitted high; but that when the cells were numerous and small, the vibrations of the mercury were large and the sounds bass. Again, the number and pitch of the vibrations produced by the same current can be varied by transmitting it through a primary or secondary coil of wire.

The Philadelphia *Ledger* says the use of steam for city passenger railroads would be a great saving of horseflesh. The time will yet come when not a horse will be seen drawing a car in any city.

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VOL. VII. NO. 3.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, JULY 19, 1862.

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OUR WORKSHOPS HAVE SAVED THE ARMY.

Last summer we gave an account of the rapid manufacture of artillery that was going on in many of the Northern workshops, and remarked that the next great battle would be at least a noisy one. It has been not only noisy but awfully bloody; the losses on both sides having been surpassed in few, if any battles recorded in history. Nothing is plainer than that our army was saved from utter annihilation by our superiority in artillery. The number of guns in the army of the Potomac is stated at upward of 400, and the enemy, with all their energy in melting church and cow bells, have not been able to provide nearly as many. By means of our cannon we were able to repulse all of their attacks. The rebel officers drove their troops forward upon our batteries in the most reckless and determined manner, but our trained artillerists stood steadily to their guns, and mowed down the advancing foe in long lines, literally piling the ground with dead. The only successes which we have yet achieved have been due to our superiority in the mechanic arts.

With sadness, however, which we cannot express, we fear that the skill of our mechanics, the self-sacrifice of our people, and the devoted heroism of our troops in their efforts to save the country, will all be rendered futile by the utter incompetency which controls the war and navy departments of the Government.

MANUFACTURE OF DAMASCUS SWORDS.

In olden times the city of Damascus, in Syria, was renowned for its cutlery, and particularly for the manufacture of sword blades. The fame of these swords extended throughout Asia and most of Europe. They were so elastic that they could be bent like hoops, without breaking, while at the same time their cutting edge was as keen as that of a razor. Damascus blades possessed a wavy surface of regular bright and dark lines, and the mode of manufacturing them was kept a profound secret by the armorers of that city. Reese, in his Cyclopedia, states that they were made of a peculiar kind of steel, and it was the character of the metal, not the mode of making them, which gave them such superiority. The same idea is conveyed in the interesting article on the subject in the "New American Cyclopedia." From information which we have received on the subject—and which we shall hereafter cite—such statements do not appear to be reliable. Reese says of Damascus swords:—"About the beginning of the 14th century, Timeur Leng, on his conquest of Syria, conveyed all the celebrated manufacturers of steel from Damascus to Persia. Since that period its works in steel are little memorable. They were formerly of the highest reputation in Europe and the East. The famous sabres appear to have been constructed by a method now lost, of alternate layers, about two or three times thick, of iron and steel. They never broke, though bent in the most violent manner, and they retained the utmost power of edge, so that common iron, and even steel, would divide under their force."

The method of manufacturing Damascus blades was undoubtedly lost for centuries, but the "New American Cyclopedia" states that the Russian General, Anossoff, rediscovered the process of producing Damascus steel by smelting 11 lbs. of charcoal iron in a crucible with $\frac{1}{12}$th of graphite, $\frac{1}{32}$d part of iron scales and about $\frac{1}{24}$ths of a fusible flux such as dolomite. These substances are submitted to intense heat, in a blast furnace, for about five hours, when the scoria is scummed off, and the molten ingot of steel thus formed, is drawn under the hammer, and submitted to several heatings and hammerings. Of steel thus made, it is asserted that General Anossoff made several blades like those of Damascus, having the same dark and light wavy lines, which were produced after the blade was formed by pouring dilute sulphuric acid over it. General Anossoff died in 1851, and it is stated that his successors have not been able to produce such like swords. We do not wonder at this, for assuredly swords of the Damascus appearance, with wavy lines, cannot be made from bars of pure steel. The waving lines on such swords nearly resemble the minute and graceful shadings of the fine watered silk of which ladies' dresses are made, and they are due to the method of fabricating the blade, and also the combined metals of which it is composed. Blades resembling the old Damascus cimeters are not uncommon in this city, and they equal them in temper and elasticity. We are indebted to Mr. Herman Vasseur, No. 9 Maiden Lane, this city, sword mounter and scabbard manufacturer, for a description of these blades. They are made at Solingen, in Germany, the only establishment of the kind in the world. A faggot is first formed of alternate fine bars or wires, of iron and steel. Such a faggot is then drawn out, doubled and twisted several times, and formed into a ribbon. Two of such forged ribbons of iron and steel are then welded together, inclosing a thin blade between them of the best cutting English steel, and thus a Solingen Damascus blade is formed. The interior thin blade of English steel gives the sword a desirable and perfect cutting edge, and the combined twisted iron and steel, outside layers, impart to it peculiar toughness as well as the beautiful wavy surface for which it is also much prized. When ground and polished no wavy lines are recognized but by dipping the blade for a short period into dilute sulphuric acid, a portion of the iron on the surface is dissolved, while the carbon of the fine steel bars is unaffected, and appears in dark wavy lines contradistinguished from the white wavy surfaces of the iron bars. These blades are imported plain, and mounted in this city. Mr. Vasseur has lately mounted some of them in a splendid manner, to order, as presentation swords for several officers of our army and navy. The scabbards are made wholly of silver, and highly ornamented, while the hilts are tastefully mounted, with appropriate designs, partly cast and partly engraved. A silver scabbard is made by hammering rolled plate silver upon an iron mandrel of the proper form, and thus the plain sheath is produced. The ornaments, consisting of neat designs in silver, are cast from patterns, then trimmed and soldered to the sheath. A considerable portion of these silver scabbards are also gilt. They are certainly splendid specimens of sword mounting.

The inlaying of iron and steel with gold and silver is called Damaskeening, because this art was carried on upon a great scale when Damascus was the armory of Syria. It is executed by cutting burr grooves with a cold chisel, in the steel before it is hardened, and then hammering gold or silver wire in these grooves. This art is of great antiquity. We have read and heard it frequently stated that the superiority of Damascus swords was due to the mode of tempering them. This consisted in heating the hardened blade to a blue color, and handing it to a rider sitting on horseback, who instantly started off at a gallop, waving the blade against the cold north wind, which was required to be blowing at the time, or the operation could not be performed. We put no credence in such stories, because it is scarcely possible to temper a piece of very thin steel by waving it in the atmosphere, at a high velocity, during the coldest days in winter. The beauty and superiority of the Solingen blades must be credited chiefly to the skill of the artisans who fabricate them.

STEAM HAMMERS.

The London *Engineer* gives a description of the steam hammers in the Exhibition, from which we have condensed much of the following article:—

There are different classes of steam hammers; one has a fixed vertical cylinder with the hammer block secured on the outer end of the piston rod. The steam acting upon the piston inside of the cylinder raises it the full length of the stroke, then the steam exhausts and the hammer falls down by force of gravity upon the article to be forged. Another kind of steam hammer is quite the reverse of this. The piston in the inside of the cylinder is stationary, and is secured to a fixed rod; the cylinder forms the hammer, it is lifted by the pressure of steam, and then it falls by its own gravity. In both of these cases the hammers are single-acting, the steam being only employed to raise the piston, or the cylinder. In another class of steam hammers the steam pressure is used to act upon the hammer as it descends, thereby communicating to it a higher velocity than it could obtain by the action of gravity alone. This is a double-acting steam hammer. In the arrangement and construction of various parts of such hammers much difference exists.

A history of the progress of steam hammers will throw much light on their construction and application. Like the modern steam engine itself, they are of Scottish origin. The first that is mentioned in the history of inventions is that of James Watt, described in his fifth patent, dated April 28, 1784. In that patent he claims "applying the power of steam engines to the moving of heavy hammers for forging iron without the intervention of rotation wheels, by fixing the hammer to be so worked either directly to the piston or piston rod of the engine, or upon or to the working beam of the engine."

The next patented steam hammer was that of William Deverill, of London, in 1806. He claimed securing the hammer to the end of the piston rod, raising the piston by the steam, and then exhausting, when the hammer descended by its gravity.

Neither of these patents were ever put into practical operation. It is to James Nasmyth, of Edinburgh, that the engineering world is chiefly indebted for the

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introduction and practical application of the steam hammer. In 1838 he made drawings and arrangements for making a steam hammer with a stationary cylinder, and the hammer on the piston rod, but it was not until 1842 that he took out a patent. In one important feature, without which this hammer is of little value, it differed from the patents of Watt and Deverill. It provided for the lift of the hammer so as to graduate the blow. This is the steam hammer which was first introduced into the United States. The inventor of the moving cylinder steam hammer was the late John Condie, of Glasgow, who patented his improvement in October, 1846. This hammer is well known in America. The improvement simplified the construction and diminished the weight and cost of the hammer, as the weight of the cylinder is usefully applied for the hammer. A knowledge of its distinctive character was first generally communicated to our mechanics through the columns of the Scientific American, in an illustrated description of it on page 337, Vol. III. (old series). Steam is admitted through the hollow piston rod, and it may be used either as a single or double-acting hammer. In 1853 Robert Morrison, of Newcastle-upon-Tyne, patented and erected a steam hammer, for his own use, having the piston rod and piston forged in one piece, and of such a size and weight as to form the hammer. The piston rod was extended above the cylinder cover and worked through a long stuffing box, which formed a guide for it. This hammer has been used for ten years, and is as sound to-day as when first put up.

In October, 1855, Wm. Naylor, of Norwich, patented the application of gear for rendering the steam hammer double acting. This improvement has been extensively adopted in England. Robert Morrison also early applied steam on both sides of his piston, but he considers that double-acting steam hammers, while they may be useful for light forgings, should never be employed for heavy work. About 60 blows per minute are given by a single-acting gravity hammer. The tendency of double-acting hammers moving rapidly on large masses of iron, is to consolidate the skin and produce an unsound forging; the center of a large shaft thus hammered will not be so sound as one forged with a single-acting hammer.

This is the opinion of Mr. Morrison on the action of double and single-acting steam hammers, as given in a communication to the *Engineer*. Mr. Naylor expresses quite a contrary opinion, through the same source, in favor of quick-moving double-acting hammers for all kinds of forgings. He asserts that the inside of a shaft may be forged as soundly with a 5-tun hammer moving with a high velocity as a 15-tun hammer with a low velocity. He says respecting the pressure of the steam assisting the gravity of the hammer:—"If the propelling force be three times greater in one case than the other, the velocity at the end of the stroke will be as if it had fallen through three times the distance; and the effect of the blows will be as its initial weight (the hammer's) multiplied by the square of the velocity."

The largest steam hammer in the world, we understand, is used at the celebrated steel works of H. Krupp, in Prussia. The head alone of this hammer weighs 40 tuns, and the cylinder and framing correspond in weight. The cylinder is adjustable upon its standard so that the hammer may be raised and lowered bodily to adapt it for forging work of different degrees of thickness. The same object is attained by modes that are employed for raising and lowering the anvil block. Messrs. Imray and Copeland, of London, have patented an anvil block set in a close reservoir of water, and the block is raised or lowered like the ram of a hydraulic press by a force pump. A Belgian steam hammer with a water-bed anvil block is in the Exhibition. The shock of the blows is distributed over an extensive surface and this is claimed to be a great advantage.

THE LONDON EXHIBITION.

In America two modes of telegraphing are now chiefly used, namely the sounding system by Prof. Morse's electric magnet, and the recording system by printing messages with the combination instrument, which is a modification of the House Telegraph. In Europe a greater variety of modes are in use for telegraphing than with us. With respect to the instruments at the Great Exhibition, we condense the following from the London *Mechanics' Magazine*:—

BRITISH TELEGRAPH INSTRUMENTS.

The machines of various kinds which serve for the conversion of electric force into human language may be classified as follows, viz.:—Into needle telegraphs, whose communications are made by the oscillations of one or more magnetic needles, to the right or left, at the will of the operator, a specific number of such movements being appropriated to each letter or figure, and agreed upon as its representative to the eye of the receiver. "Dial," or "step-by-step," telegraphs, in which a pointer, like the hand of a clock, turning on its axis in the center of a circular dial is caused to indicate any desired letter inscribed around the circumference of the latter. Recording telegraphs, wherein combinations of dots and strokes, indented or otherwise marked upon ribboned paper, are made to represent each character in the alphabet. Printed telegraphs, whose signals are produced in plain printed type. And, finally, acoustic telegraphs, or electricity made vocal, on which plan correspondence is carried on by sound alone.

Of needle telegraphs (the class of instruments chiefly made use of in Great Britain), there are several exhibitors. The British and Irish Magnetic Telegraph Company show the single-needle instruments of the late Edward Highton, who was the first to bring into practice the use of one line wire in connection with them, so as to obtain a result in working power equal to that of the old system of double wires and needles. Messrs. Reid Brothers exhibit the double-needle system, as used by the Electric and International Company.

Of dial telegraphs, all the specimens exhibited are exquisite pieces of workmanship. It may be doubted whether this system could be made practically available for telegraphing to any considerable distance; but it is admirably adapted for the purpose to which it is being extensively applied by the Universal Private Telegraph Company, recently established for erecting and maintaining, at small fixed annual rentals, private lines of communication in large towns, for the use of persons desirous of having several places of business brought within speaking distance of each other. The instrument exhibited by this company is the invention of Professor Wheatstone. It consists of two distinct parts, the "communicator" for sending, and the "indicator" for receiving messages. The communicator contains a permanent horse-shoe magnet, at the poles of which are placed electro-magnetic coils. An axis, bearing a soft iron armature, and connected to wheelwork, moved by a handle external to the box, is made to revolve so as to pass rapidly over the poles of the magnet, inducing thereby currents of electricity moving alternately in opposite directions through the wire of the coils and along the conducting line to the distant indicator. Externally the communicator has on its upper surface a fixed dial divided into thirty spaces, twenty-six for the alphabet, three for punctuation, and one for zero. An inner circle marks the nine digits. A pointer in the center rotates by mechanism, and stops, at the will of the operator, opposite the letter he desires to send. Around the outside of the dial are thirty small depressible keys or buttons, one for each sign; these being depressed in succession, will, by means of internal mechanism, each liberate one current or thirty distinct currents during an entire revolution of the hand from button to button round the dial. For every current thus transmitted, the pointer of the communicator and that of the indicator at the distant station will simultaneously advance step by step until they reach the letter opposite the depressed key or button. The indicator, resembling a small clock, has inscribed on its face the same letters and numerals as the communicator, and its hand receives its motion, synchronous with that of the latter, by means of an electro-magnetic apparatus.

The recording telegraphs, in some form or other, are the class of instruments in all but universal use everywhere, except in Great Britain. The parents of this system are Morse, of America, whose signals are dots and strokes, indented with an iron style upon paper, against and from which the style can be pressed and released at pleasure, by electro-magnetism, the paper itself being continually drawn forward in front of the style between rollers, moved by ordinary clockwork machinery; and Bain, of England, whose signals were obtained by using the decomposing power of the current for making marks upon chemically prepared paper.

The improvement of such instruments now work more or less automatically. The automatic system of R. Allen is especially ingenious. It consists of three machines; the punching machine is the first of these, and by this the ribbon paper to be passed through the sending machine is perforated with holes, representing dots and strokes of the Morse alphabet, at those points only where the current is required to mark on the unperforated ribbon at the receiving station; next is the sending machine, into which the perforated paper is introduced. This machine winds up its own clockwork, whereby the paper is drawn forward, and stops of its own accord when the message is completed, and lastly, the receiving instrument at the distant station, which is also so arranged as to start its own machinery on receiving the electric impulse, and stop it when the perforated paper at the other end has passed through the sending apparatus.

Professor Wheatstone's automatic recorder is another very beautiful instrument of this class. The message to be sent has to be punched out, as in the former case; but instead of using lines and dots for signals, as in the Morse system, the signals here are all dots, but are grouped above and below a line of smaller perforations, running horizontally along the middle of the paper ribbon. The punched out message forms a sort of jacquard pattern, which is introduced into the sending instrument, and by turning a handle it is passed through it at a uniform rate; as each hole in the paper comes through the center of the clip which keeps it even as it passes, three springs, attached to an axis in connection with the handle, rise up, but only one of these can rise through the paper, because there will only be one perforation presented at the same time.

In printing telegraphs, the only instrument exhibited is that of Mr. Jacob Brett, which is memorable historically, being the instrument by which the first message was received through the first submarine cable.

The acoustic telegraph of Sir Charles Bright and his brother is a very interesting piece of electro-magnetic mechanism, beautifully simple and practical. It is exhibited by the British and Irish Magnetic Telegraph Company, who use it extensively on their lines. The current is set in motion by a pair of finger keys, one passing positive, the other negative currents, and so connected, that the sender does not pass the current through his own receiving apparatus, but only to that of his correspondent, who is thus able to reply instantly on the sending key being released. Two small hammers attached to the armatures of two electro-magnetic coils, perform their office in obedience to the temporary magnetism induced at will in the soft iron cores of the latter. These hammers are thus wielded by the operator hundreds of miles away, and by means of preconcerted strokes on two bells of different tone, endow with mysterious life these "airy tongues that syllable men's names;" ringing marriage peals and knells of death, and identifying themselves with every phase of humanity.

Besides these instruments of every day use, we must not omit to notice the marine galvanometer of Professor W. Thompson, the use of which was so important in obtaining signals across the Atlantic. Its specialty, however, is for making delicate tests of long cables, especially at sea. Inside the coils, a small magnet fastened to a little circular mirror is strung on unspun silk fiber, passing through its center of gravity. Outside the coils a strong directing magnet overpower's the force of the earth's magnetism. By this arrangement, neither that force nor the motion of the ship sensibly affect the position of the suspended magnet relatively to the coils. The deflection caused by currents through the coils are shown by a spot of light reflected from the mirror on to a graduated scale. This spot remains quite steady, no matter how much the ship pitches or rolls. Most accurate measurements of electric currents can thus be made at sea in all weathers.

Portable gas is manufactured in Paris on a large scale for the supply of workshops, &c. The Company have recently published a report of their operations.

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RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list on another page :—

Mode of Applying Netting to Windows —The object of this invention is to provide a means for applyirg netting to windows for the purpose of excluding dust and mosquitoes, which shall be self-regulating and capable of being removed at pleasure. The invention consists, first, in inserting elastic bands in the sides of the fabric, which are cut of such length that, when fully stretched, the sash shall have reached its highest point. Thus, when the sash is being raised, the elastic bands will stretch and cause the netting to conform to any desired area of opening ; and, at the same time, keep the netting close up against the sides or sash guides of the window, which is quite essential for the exclusion of both dust and mosquitoes. Secondly, it consists in the arrangement of two rods—one on the sash and one on the lintel of the window—which drop in hooks or spring in eyes provided for them. The netting, with the elastic sides, is secured at its top and bottom, respectively, to the said rods. When it is desired to use the netting, it is only necessary to spring the bars in place, and in the same manner remove it. Netting may be applied by this mode to either the upper or lower part of a window, (or to both at the same time), thereby insuring an uninterrupted ventilation of a room without annoyance from dust or mosquitoes. The patentee of this invention is M. M. Livingston, of Brooklyn, N. Y.

Letting-in Machine for Gun Stocks.—This invention consists in a machine composed of a rotating holder for containing the gun stock and having attached to it a series of patterns corresponding with the mortises and other cavities to be cut in the stock for letting in the metal work; combined with a reciprocating carriage for moving the said holder lengthwise, or in the direction of its axis, and with a rotating cutter and a tracer, in such manner that all of the said mortises or cavities may be cut without removing the stock from the machine, as is necessary in the letting-in machines at present in use for gun work. This saves labor and insures a perfect uniformity in the stocks, so that the parts of one may interchange with those of another, as is required in all government arms of a given pattern. H. W. Oliver, of New Haven, Conn., is the inventor.

String Clamp for Pianos.—This invention relates to the employment, in pianofortes, of what are termed string clamps for clamping the string at the points between which it should vibrate and prevent any vibration in the portions beyond those points. In such clamps as previously constructed and applied, the drawing together of the two jaws or portions of the clamp on opposite sides of the string, is effected by means of a screw which screws into the string bearing and secures the clamp thereto without any independent or positive action upon the said jaws or portions of the clamp. The consequence is that from various causes, as the occasional settling of the lower or back portion of the clamp, into the wood of which the said bearing is composed, the shrinking of the wood or the settling of the bearing itself, the clamp is apt to become loose upon the string, and thus its object is defeated. This invention consists in so applying the clamping screw as not only to make it serve the purpose of attaching the upper or outer portion of the clamp to the bearing, but to screw into the lower or inner portion of the clamp, and thus produce an independent or positive clamping action between the two portions of the clamp themselves ; this obviates any liability of the clamp to become loose upon the string. Ferdinand C. Lighte, of New York city, is the inventor.

Tanning Vat.—This invention consists in constructing the shell of a tanning vat with tongued and grooved joints, and iron bolts running through the plank on the side of the tongues for the purpose of drawing the joints up tight whenever it becomes necessary ; it consists also in the arrangement of a series of framed timbers around the sides, and on the ends of the vat, with iron bolts or stirrups running through them crosswise and lengthwise of the vat, in such a manner that the whole structure can be drawn together either sideways or endways, and at the same time the timbers, which run across the manholes and retain the manhole covers, can be removed and replaced at pleasure. The inventor is Jesse S. Wheat, of Wheeling, Va.

Churn.—This invention relates to an improved churn of that class in which either hot or cold air is introduced into the cream during the process of churning. The object of the invention is to obtain a simple and cheap means for the intended purpose, which may be applied to the up-and-down plunger churn, the kind most generally considered as being preferable to all others. It consists in the employment of a bellows in connection with a coiled pipe or receptacle for holding warm or cold water, and a valvular dasher, all arranged and applied to the churn in such a manner as to effect the desired end. A. P. Myers, Isaac Searles and G. W. Spencer, of Prattsville, N. Y., are the inventors, and the patent is dated Jan. 17, '62.

Valve or Wicket for Canal-Lock Gates.—This invention relates, first, to an improvement in the construction of the valve or wicket, which is of wood and metal combined, and arranged in such a way as to effectually prevent springing or warping, and render it extremely strong and durable. Second, to a novel arrangement of the valve or wicket, as regards the relative position of its axis with its ends, and also as regards the shape of the latter, whereby the pressure of the water is made available in keeping the wicket closed and in assisting to open it when started from its seat. Third, to an improvement in the seats of the valve or wicket whereby the same is rendered water tight when closed and a substantial and firm bearing obtained. George Heath, of Little Falls, N. Y., is the inventor.

Radiation of Heat at Night.

About the period of sunset, provided the sky be clear, the temperature of the air in contact with the earth's surface is cooler than that of the atmosphere at a certain hight above the ground. This is attributable to the gradual cooling of the earth's surface, arising from the nocturnal radiation of the heat into empty space. The cooling of the surface of the earth naturally gives rise to a corresponding diminution of the temperature of the stratum of air in its immediate vicinity ; the effect is communicated to the stratum above, though naturally in a less degree, and so on from one stratum to another, until a hight be obtained at which the temperature of the atmosphere is found to be equal to that of the stratum of air in contact with the earth. Professor Marcet in October last made a series of observations on the Lake of Geneva to ascertain whether the effects of nocturnal radiation, tending to produce a gradual increase of temperature on ascending above the earth's surface, are entirely dependent on the radiation of the ground, properly so called, or whether they are equally perceptible above a large sheet of water.

With mercurial thermometers capable of showing a tenth part of a degree (Centigrade) the temperature of the air at three inches, six feet and fifteen feet above the surface of the lake, was examined, the observations being made at the distance of about 600 yards from land during exceptionally fine weather. Comparative observations were made at the same moment on the borders of the lake within a few feet of the water, and in the center of a large field about 700 yards from the lake. The average results of these observations are given in the following table, the temperature being expressed in Centigrade degrees :—

	Lake.	Shore.	Field.
Surface	12°·	9°·90	6°·98
3 inches	11·65	10·40	8·
6 feet	11·62	10·55	9·10
15 feet	1·180	10·62	9·65

From these observations Marcet draws the following conclusions :—1. The gradual increase of temperature occurring on ascending through the lower strata of the atmosphere, which appears constantly to prevail on land about and after sunset, is not apparent above a large surface of water. 2. The immediate vicinity of a large sheet of water is sufficient to modify to a considerable extent the effects of the nocturnal radiation of the earth, and thereby materially diminish the increase of temperature observed under ordinary circumstances on ascending above the surface of the ground. 3. A striking difference (amounting to between 2 and 3 Centigrade degrees) is constantly observed between the temperature of the atmosphere a few feet above the ground, and that of the air at the same hight above a large sheet of water.

It is well known that farmers who reside closely adjacent to our Northern lakes, are not so liable to have their crops injured by late and early frosts, as those whose farms are situated at some distance from the lakes. The experiments of Professor Marcet explain the cause of this.

Venetian Water Cisterns.

The city of Venice is wholly supplied with rain water which is retained in cisterns. The city occupies an area of about 1,300 acres. The annual average fall of rain is 31 inches, the greater part of which is collected in 2,077 cisterns, 177 of which are public. The rain is sufficiently abundant to fill the cisterns five times in the course of the year, so that the distribution of water is at the rate of 312 gallons per head. To construct a cistern after the Venetian fashion, a large hole is dug in the ground to the depth of about 9 feet. The sides of the excavation are supported by a framework made of good oak timber, and the cistern thus has the appearance of a square truncated pyramid with the wider base turned upward. A coating of pure and compact clay, 1 foot thick, is now applied on the wooden frame with great care ; this opposes an invincible obstacle to the progress of the roots of any plants growing in the vicinity, and also to the pressure of the water in contact with it. No crevices are left which might allow the air to penetrate. This preliminary work being done, a large circular stone, partly hollowed out like the bottom of a kettle, is deposited in the pyramid with the cavity upward ; and on this foundation a cylinder of well-baked bricks is constructed, having no interstices whatever, except a number of conical holes in the bottom row. The large vacant space remaining between the sides of the pyramid and the cylinder, is filled with well-scoured sea sand. At the four corners of the pyramid, they place a kind of stone trough covered with a stone lid pierced with holes. These troughs communicate with each other, by means of a small rill made of bricks, and resting on the sand ; and the whole is then paved over. The rain water coming from the roofs of the buildings runs into the troughs, penetrates into the sand through the rills, and is thus filtered into the well hole by the conical holes already described. The water thus supplied is limpid, sweet and cool.

Potabilisation of Sea Water by the Electric Current.

In *Macmillan's Magazine* is an interesting paper by Dr. Phipson, entitled, "Electricity at Work," in which the author passes in review the useful applications of this wonderful agency. He concludes his paper as follows :—"Reflecting upon the powerful decomposing chemical force with which we are furnished by the electric current, it occurred to me that I might be able to render sea water potable by decomposing and extracting its salt, by means of a moderately powerful battery. The experiments were made at Ostend a few years ago. My apparatus consisted of three vessels containing sea water ; the center one contained the water to be operated upon, the two others communicated with the two poles of the battery. The three vessels were connected by two bent Π-tubes filled with sea-water. As the only battery I could procure in Ostend was rather weak, I passed the current through the water for about fourteen hours, after which one of the outside vessels had become acid and the other alkaline. The sea-water was then filtered through charcoal, and was nearly drinkable. It would have been, I doubt not, quite potable had the battery employed been more powerful ; as it was I found it difficult to extract the last particles of salt ; and the water, after subsequent trials, still presented a slightly brackish taste. I have not had an opportunity of repeating this experiment since, but from the results obtained, I think it probable that sea water may be rendered potable by means of the electric current."

THE number of letters delivered in the post offices in Great Britain, during 1861, was 593,000,000, or about 22 to every person. In the same period 72,300,000 newspapers and 12,300,000 books were delivered by the post office. Money orders were also sent through the same agency amounting to about $75,000,000.

THE Stockton (Cal.) *Independent* of June 7th, says the shipment of copper ore from Copperopolis to Stockton averages 30 tuns per day, at $8 per tun. The ore sells at $100 per tun.

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ISSUED FROM THE UNITED STATES PATENT OFFICE.

FOR THE WEEK ENDING JULY 1, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

35,743.—B. F. Bean, of Schuylkill, Pa., for Improvement in Wagon Standards :

I claim the combination of the socket, A, slide, B, spring, D, and pin, E, constructed and adapted to operate together in manner substantially as and for the purposes specified.

[This invention is particularly designed for wagons for hauling lumber. The standard may be secured at its full hight to support the load in position while the wagon is in motion, or readily loaded to facilitate the operation of loading or unloading.]

35,744.—C. H. Brady, of Mount Joy, Pa., for Improvement in Molds for Casting Plow Shares :

I claim the combination of the flask, formed by the chill-drag or nowel, B, and cope, C, arranged substantially in the manner set forth.

I also claim casting and chilling plow irons in a vertical position by means of such a flask.

35,745.—D. C. Brown, of New York City, for Improvement in Running Gear of Vehicles :

I claim, first, The flexible joint between the sectional reaches, A and B, in combination with the sliding box, C, substantially as and for the purpose described.

Second, The finger, D, on the sliding box, C, in combination with grooves or channels, f and g, substantially as and for the purpose set forth.

35,746.—Henry Burden, of Troy, N. Y., for Improved Machine for Making Horseshoes :

I claim, first, The peculiar arrangement of four eccentrics operating simultaneously in a machine of this kind by which a horseshoe which has been previously shaped may be punched, creased and finished without any bulging of the outer surface and without the danger of the shoe being split or cracked, substantially as described.

Second, Giving a varying motion to the side supports in my said machine, by which I secure a uniformity of motion between the surfaces of those supports and the edges of the shoe with which they respectively come in contact, by means which are substantially set forth.

Third, The mode of adjusting the creasers, as set forth.

35,747.—Otto Ernst, of New York City, for Improved Vessel for Extracting Essences :

I claim the pipe-shaped strainer, d, applied in the cup or vessel, c, in combination with the vessel, b, and plug or stop to the pipe, d, in the manner and for the purposes specified.

35,748.—G. P. Farmer, of Philadelphia, Pa., for Improvement in Machines for Sticking Needles into Paper :

I claim, first, The use of the partitions, i i, in the hopper, A, for the purpose of separating the needles from each other, arranging them in a row, and determining the number contained in each row.

Second, The hopper, A, with its partitions, i, in combination with the channels, t t, in the table, B, when a lateral motion is imparted to the hopper by the devices described, or their equivalents, for the purpose specified.

Third, The reciprocating rods, k, adapted to the channels, t t, of the tables, B, and arranged in respect to the hopper, A, and its partitions, and operating substantially as specified.

Fourth, The crimping block, L, with its projections, a, the channels, t t, and transverse grooves, y, the whole being arranged so as to act on the paper, substantially as and for the purpose set forth.

Fifth, The use of a block, Q, having three or any convenient number of sides, with points, v, at the corners and having an intermittent revolving motion for the purpose of drawing the paper forward and determining the distance apart of the rows of needles to be stuck into the paper.

Sixth, The plates, R, arranged on the block, Q, and operating so as to strip the paper from the points, v, substantially as specified.

Seventh, Providing the hopper, A, with the rod, w, or its equivalent, the same being so constructed and arranged in respect to the cross-head, E, that should the partitions in the hopper fail to direct the needles to their destination, the said rod will at once retard the further movement of the machine.

35,749.—Walter Fitzgerald, of Salem, Mass., for Improved Pegging Machine :

I claim, in a pegging mechanism, relieving the rotating cam or cams, which lift the awl bar or driver bar, or both, from the pressure of a compressed spring or springs brought upon said cam or cams, in elevating said bar or bars, during that time of the rotation of said cam or cams in which said bar or bars are required to remain at rest in their highest elevation, by transferring the contact and pressure of said bar or bars from said cam or cams to a stop or stops, from which said bar or bars can be detached at the proper times, substantially as specified.

Also the combining the piston, p, and spring, r, so that the peg or pegs displaced by the piston in its movement to close the peg tube shall be replaced by the spring in the peg tube, when the piston moves to open the tube.

Also combining the piston, p, and spring, r, and a stationary knife, so that the movement of the piston shall sever a peg from the peg wood by forcing the wood upon the knife, and so that the spring shall return the wood, and the peg severed therefrom, to their normal positions, upon withdrawal of the piston.

Also, in combination with the sliding and oscillating head of a pegging machine, the arrangement, substantially as described, of the driving shaft, i, by which it is kept in one place while its distance from the center of the driven shaft remains unaltered in the different positions which the head assumes in pegging, and by which I am enabled to connect the shafts, i and g, by spur gearing.

35,750.—D. Flower, of Geneva, N. Y., for Improvement in Trimming Wall Paper :

I claim the shaft, C, having feed rollers, h h, the extremities of said shaft resting in concentric arms, D D, and held down by springs, k k, so that the rollers may be raised for inserting the edge of the untrimmed paper under them and without throwing the wheel and pinion out of gear, substantially as set forth.

I also claim the elastic band, L, running closely to or in contact with the surface of the table in combination with the feed rollers, h and m, situated at such a distance apart as is sufficient to hold the paper securely in place while it is being trimmed, substantially as described.

I also claim placing the shaft, H, obliquely to the shaft, C, and to the direction of feed, for the purpose of throwing the heel of the cutter away from the edge of the trimmed paper, so as not to interfere with it, arranged substantially as set forth.

I also claim the cleft rod, P, for seizing and holding the end of the trimmed paper, and rolling it as it is delivered from the feed rollers, h m, arranged in such a manner that the increasing size of the roll shall not take up the paper faster than it is delivered from said rollers, substantially as described.

35,751.—Henry Green, of Antwerp, N. Y., for Improved Metallic Heels for Boots and Shoes :

I claim the combination of the parts, A B, provided with the shank piece and counter piece, and constructed with the flanch and angles for clamping the leather, all substantially as and for the purpose specified.

[The object of this invention is to obtain a metallic heel which may be applied to a boot or shoe with great facility and render the same far more durable than those applied in the ordinary way, and also serve as a support to the hollow of the sole as well as to the back part of the boot or shoe, keeping the same in proper form or shape until entirely worn out.]

35,752.—Ludwig Haecker, of Altenburg, Hungary, for Improvement in Brewing when Indian Corn is Used :

I claim the described process of producing maize beers by treating maize mixed with barley or malt about in the proportion and substantially in the manner set forth.

[The object of this invention is to employ indian corn mixed with barley in certain proportions, for the purpose of brewing beer by a simple process, which requires no expensive machinery, and which can easily be introduced into any brewery old or new.]

35,753.—E. E. Hendrick, of New York City, for Improved Lubricating Composition :

I claim as a lubricator for machinery, a fluid or compound, the bulk or excess of which is composed of coal oil produced in a state of nature, and with which caoutchouc is combined.

35,754.—E. E. Hendrick, of New York City, for Improved Lubricating Composition for Machinery :

I claim the use of a solution of caoutchouc in connection with coal oil and water, substantially in the manner and for the purpose set forth.

35,755.—James Hamblet, Jr., of Boston, Mass., for Improvement in Watch Clocks :

I claim the successive electrical connection of each wire of a series or groups of wires, in such manner that but one conducting wire, leading to one apartment or place, can be used at one time, while the action of the whole series makes one full or complete record of the entire rounds of the watchman, as set forth.

I also claim the combined action of the traversing connecting arm, 20, and the pencil or marker, by which a record is produced that shows the time when the electrical connection was made, and the interval between each successive connection, as set forth.

I also claim the series of revolving cams, or their equivalents, when their motion is controlled or regulated by the combined action of an electro-magnet and the connecting arm, 20, substantially as described.

35,756.—George Heath, of Little Falls, N. Y., for Improvement in Valves or Wickets for Canal-Lock Gates :

I claim having the ends of the valves, B, provided with heads, D, that have hollow journals, C, projecting therefrom, and openings, e, for the entrance of tenons, b, in combination with the central shaft, E, substantially as and for the purpose shown and described.

The combination of the beveled bars, F F, on the edges of the valves with the V-shaped grooves, g g, in the heads, D D, in the manner and for the purpose shown and described.

I claim the arrangement of the beveled edges of the valves and cleats, G G, with the central axis, in the manner substantially as shown and described, so that the valves, although having their axes in the center, will present the greatest area for the pressure of the water above their axes, all as set forth.

35,757.—J. Hubler and R. M. McGrath, of Lafayette, Ind., for Improvement in Corn Shellers and Cleaners :

We claim, wherein a rod cylinder and toothed shaft and screen cylinder are used substantially as covered by the patent to Richards, Hubler and McGrath, of the 25th of September, 1860, making the sheller shorter than the cleaner, or, in other words, in having the screen cylinder or cleaner longer than the rod cylinder or sheller, as set forth.

35,758.—E. J. Hyde, of Philadelphia, Pa., for Improvement in Coffee Roasters :

First, I claim so combining a stove, a crane and a roaster that the roaster may be revolved upon the crane over the fire, swung out horizontally from the stove to an angular position therewith, and in this position be turned upon the crane to empty its contents, as set forth.

Second, The combination, substantially as described, of the crane, E', and roaster, F, for the purpose set forth.

Third, The manner, substantially as described, of constructing the end portions of the stove, A, in combination with the manner of constructing the end portions of the adjustable door, E, for the purpose set forth.

Fourth, The arrangement of the damper, H, in combination with a removable roaster, F, for the purpose set forth.

35,759.—Henrietta C. Ingersoll, of Bangor, Maine, for Improved Broom :

I claim the application of a sponge, C, or its equivalent, to a corn broom, A, substantially as and for the purpose described.

[This invention consists in the arrangement of a sponge or other device capable of taking up and holding a comparatively large quantity of water by capillary attraction, in combination with a corn broom, in such a manner that during the operation of sweeping the broom, by the pressure of the broom corn on the sponge, is gradually supplied with moisture, and thus kept for a long time without any trouble or danger of spilling water, and thus the operation of sweeping can be effected without any dust.]

35,760.—James Jenkinson, of Brooklyn, N. Y., for Improvement in Sliding Bayonet :

I claim the combination of the cavity, C, sliding bayonet, D, shank, E, handle, F, spring catch, G H I, and hole, e, all constructed, arranged and employed in the manner and for the purposes shown and explained.

[This invention consists in the use of a sliding bayonet adapted to be protruded and fixed in position by the motion of the hand required in lowering the piece to a position to "charge bayonets," and again retracted in the act of restoring the piece to a vertical position without the necessity of any special motion of the hand in either fixing or unfixing the bayonet.]

35,761.—T. D. Judah, of Sacramento, Cal., for Improved Spring-Back Chair :

I claim the use of flat springs to the back of chairs when said springs are in the back above the seat over a joint or joints of the chair frame, substantially as and for the purpose described.

35,762.—William Kearney, of Union Township, and Francis Kearney, of Newark, N. J., for Improvement in Pipe Tongs :

We claim the collar, C, with the leg, E', attached, in combination with the wedge, D, thumb screw, E, and inclined part, a, of the leg, A, all arranged as and for the purpose set forth.

[This invention relates to an improvement in that class of wrenches termed pipe tongs, and which are used for grasping and turning cylindrical articles, such as gas pipes, tubing, &c., for the purpose of screwing them together or forming connections.]

35,763.—J. P. Krowles, of Lockport, N. Y., assignor to himself and H. F. Warren, of South Pekin, N. Y., for Improved Spring Bed Bottom :

I claim the elastic strips, C C C, in combination with the slats, A A A, coiled springs, E E E, and adjusting blocks, H H, the whole arranged and operating substantially as set forth.

In combination with the above, I also claim the screw bolts, G G, for adjusting the ends of the slats and strips, arranged substantially as specified.

35,764.—J. W. Kelley, of Ypsilanti, Mich., for Improvement in Seeding Machines :

I claim, first, The horizontal rotating seed distributer, G, when provided with flanches, b, and placed in a cylindrical box, F, below and communicating with the box, D, and used in combination with the slide, P, arranged to work over the discharge opening, c, of the box, F, as and for the purpose set forth.

Second, The arrangement of the loop, a*, at the back part of the draw bar, T, projection, k, and segmental flanch, m, attached to the tooth, U, and fitted in the loop, a*, all arranged as shown, to admit of the tooth being secured to the draw bar and the former working therein, as and for the purpose set forth.

[This invention relates to an improved seeding machine for sowing seed in drills, and consists in the employment of a rotary agitator or distributor, in connection with an adjustable gate, arranged in such a manner that a greater or less quantity of seed may be sown on a given area as desired. The invention also consists in a novel arrangement of the tooth which forms the furrow and conveys the seed thereto, whereby the tooth may be allowed to yield or give in case of meeting obstructions in its path, and also readily varied and lowered by the attendant.]

35,765.—August Koch, of Rocktown, Pa., for Improved Self-Acting Drawbridge :

I claim the right and left-handed action of the screw with three threads, more or less, with sufficient pitch to allow the weight to run it back when it is opened, and also the cylinders fitting one in the other, to keep the screw at its place and giving strength to the same.

Also the opening by a rudder in the water acting as a spring to take off the shock of the boat striking the bumper, as described, or any thing else, substantially the same, and which will produce the intended effect.

35,766.—F. C. Lighte, of New York City, for Improvement in Pianofortes :

I claim so applying the clamping screw, c, that it not only serves to attach the upper or outer portion, E, of the clamp to the bridge, D, or wrest plank, B, but by screwing into the lower portion, F, of the clamp, serves to produce a positive and independent action of the two portions of the clamp upon the string, substantially as specified.

35,767.—M. M. Livingston, of Brooklyn, N. Y., for Improved Mode of Applying Netting to Windows :

I claim the application of the fabric, C, provided with elastic cords or bands, e, or an equivalent thereof, passing through its sides, to the casing and frame of a window, in combination with the rods, a a', and rings or hooks, b b', or their equivalents, arranged and operating substantially as and for the purpose set forth.

35,768.—David Matthew, of Philadelphia, Pa., for Improvement in Steam Boilers :

I claim, the special combination with the firebox, d, of the partition, f, as constructed and arranged in relation to said fire box, for the purpose set forth.

35,769.—S. T. McDougall, of Brooklyn, N. Y., for Improvement in Gas Stoves :

I claim, first, The burner, J, having a contracted top, Q, with tight joints between the sides of the burner and the circumference of the perforated plate, O', when used for heating purposes, substantially as specified.

Second, The above-described burner, or its equivalent, in combination with a gas stove composed of the base, A, cylinder, B, breast, C, and top, D, substantially as described.

35,770.—S. T. McDougall, of Brooklyn, N. Y., for Improved Washing Machine :

I claim, first, The revolving cylinder and reciprocating frame, both having ribbed surfaces, and arranged and operating in combination, substantially as described.

Second, Constructing the surfaces of such cylinder and frame of grooved slats combined with rows of balls, when the latter are arranged with respect to each other, substantially as and for the purposes set forth.

Third, Constructing the inside of the cylinder with similar friction surfaces, in combination with the series of balls or their equivalent, on the central shaft, substantially as specified.

Fourth, The hopper, as attached to and used in combination with the washboard or frame, M, in the manner and for the purpose set forth.

35,771.—J. W. McGaffey, of Chicago, Ill., for Improvement in Seed Planters :

I claim, first, The combination with a corn-planting machine, of the disk, S, and friction wheel, T, arranged and operating, substantially in the manner and for the purpose set forth.

Second, I claim the combination of the cylinder, H, shifting plugs, e e, and slide, a, with projecting pins, c c, and crossbar, X, constructed and operated as specified.

Third, I claim the combination of the flexible frame, A A, the adjustable gear and its connections, with the compound seed-distributing cylinders, H, arranged and operated, substantially as shown and described, for the purpose specified.

35,772.—Benjamen Merritt and F. M. Gibson, of Chelsea, Mass., for Improved Mechanism for operating Ships' Windlasses :

We claim our improved windlass motor or operative mechanism, consisting of the screw, D, the worm gear, C, the separate shaft, E, and the elastic screw supporter, H, arranged and applied together and to the windlass, or to the latter and a capstan, in manner and so as to operate, substantially as specified.

We also claim the described arrangement of the external cylindrical surfaces of the spring-socket cylinder, d, and the adjustable cup, b, the said arrangement being for the purpose specified.

35,773.—A. B. Morey and William Scarlett, of Aurora, Ill., for Improved Machine for Dressing Feathers :

I claim, first, The described combination of a continuous feeder to supply the feathers from a suitable hopper, a fan or equivalent blower, a series of agitators acting within an inclosed case or spout, and a perforated bottom or screen, for the purpose set forth.

Second, The employment on a feather-renovating machine of the movable hopper, N, hinged at P, as represented and adapted to be let down, and to rest upon the surface, J, or its equivalent, to facilitate the filling of the same, and to be sustained in the erect or elevated position, to feed the feathers to the machine, as set forth.

35,774.—John Myers, of Dallastown, Pa., for Improvement in Windmills :

I claim, first, The arrangement of hinged rotary post, D, and windlass, t, in combination with belt, F, running over the annular rim, B, of the wind wheel, A, constructed and operating, substantially in the manner and for the purpose shown and described.

Second, The arrangement of the secondary wind wheel, G, and transversely sliding-adjustable arm, m, in combination with the belt, E, and wind wheel, A, constructed and operating, substantially in the manner and for the purpose specified.

[The object of this invention is to produce a simple, cheap and effective device, for the purpose of making the power of the wind available for cutting fire wood or for driving small machines, such as churns, washing machines, &c., that are generally used in farm houses and by others.]

35,775.—H. W. Oliver, of New Haven, Conn., for Improvement in Machines for Making Gun Stocks :

I claim, a machine for cutting the recesses or mortises for letting in the metal work of gun stocks, composed of a rotary stock holder, G, and attached patterns, f g h i' k' k' n' and o', fitted to bearings in a reciprocating carriage, C, substantially as described, and combined with a rotating cutter, y, and tracer, t, to operate substantially as specified.

35,776.—Morris Opper, of New York City, for Improvement in Skeleton Skirts :

I claim, first, Attaching the hoops to the tapes in a skeleton skirt, by means of clasps which extend through one or more holes in the tapes, and pass around portions of such tapes, while they are secured to the hoops by other parts of the clasp, substantially as set forth.

Second, The specific construction of the clasp, A B C, consisting of the lips, A, adapted to fold over the hoop in the manner shown, and the lips, B, adapted to be inserted through the tape and to fold over the part, C, on the opposite side of the tape, in the manner shown for the purpose set forth.

35,777.—J. S. Ostrander, of Albany, N. Y., for Improved Drinking Cup :

I claim, the handle and catch on the inside, and the catch for the outside, arranged substantially as and for the purpose specified.

35,778.—Harrison Parker and Jonathan C. Sleeper, of Boston, Mass., for Improvement in Machinery for Cutting Veneers :

We claim, first, The pressure bar, d, adjusted as described, in combination with the feed screws, U U, for holding the pressure when used for cutting veneers, operated by the mechanism, in the manner and for the purpose specified.

Second, We claim the double ratchet, constructed and operated as described, for the purpose specified.

Third, We claim the cam lever, l, in combination with the adjustable slide block, p, thereon, substantially in the manner and for the purpose described.

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Fourth, We claim the combined arrangement specified, for giving a back and forward self-feeding movement to the knife, whereby the knife recedes from the block or wood for the return motion, and is again fed forward for the cut, substantially as described.

35,779.—S. S. Putnam, of Dorchester, Mass., for Improved Curtain Fixture:

I claim the described curtain fixture, in which the friction necessary for holding the weight of the curtain, is produced between the roll, B, or its spool or cap, and the friction shaft, D, which is held from revolving, substantially as set forth.

35,780.—William Rider, of Almont, Mich., for Improvement in Horse Power:

I claim the combination of the central shaft, G, and its gear, F H, with the wheels, I I J J, and the master wheel, K, as shown and described.

Having the master wheel, K, supported upon a central tube, B, in the manner shown and described.

The combination of the tube, N. and driving shaft, O, with the tube, B, and shaft, G, as and for the purpose shown and described.

[This invention consists in a novel arrangement of gearing, whereby the power of horses and other draught animals may be advantageously applied to the driving of machinery, and the power taken from various points, as convenience may require.]

35,781.—A. J. Ritter, of Rahway, N. J., for Improved Writing Desk:

I claim the combination of the partitioned box or frame, A, lids or covers, D and E, and rests or supporting boards, F and G, for the purpose of producing a portable writing desk, portfolio, work box and chequer board, substantially in the manner set forth.

35,782.—John Sebo, of Wilmington, Del., for Improvement in Hospital Bedsteads:

I claim the construction of hospital bedsteads with grooved posts, with pulleys set therein as described, for the purpose of setting the cords out of the way of attendants.

I also claim the application of the fan table, p, to such bedsteads, n the manner and for the purposes specified.

35,783.—E. D. Seeley, of Brookline, Mass., for Improvement in Cap-Priming Attachment to Fire Arms:

I claim, first, The combination of a cap holder and primer, which has an extensible case, and a gun or other nippled fire arm, substantially as and for the purpose set forth.

Second, The construction of the extensible case, A, in two parts, a b, and with spring-connecting bands, e e, or other equivalent connections, substantially as and for the purpose set forth.

35,784.—Moses Shelden, Jr., of Calais, Vt., for Improvement in Harrows:

I claim the arrangement of the teeth of a harrow in concentric series, in the manner shown by E and G, with or without the straight series, H, extending across the center, for the purposes set forth.

35,785.—A. E. Smith, of Brouxville, N. Y., for Improvement in Attaching Thills to Axles:

First, I claim the method of constructing iron or steel axletrees of wagons, and other vehicles with a drawn out or solidly-welded jack or eye on the front edge thereof, for attaching the thills thereto, substantially as set forth.

Second, I also claim the use of a square bolt, and openings in the ear pieces of the thill irons, to hold the bolt from turning on its own axis, in combination with the packing and jack, for the purposes described and made, and operating substantially as set forth.

35,786.—O. P. Smith, of New York City, for Pen Rack:

I claim the application of a notched flange or strip of india rubber, gutta percha or elastic material as a pen rack, in all and every form in which the same may be applied, the elasticity of the material firmly grasping the pen or pencil, so that when any one may be taken from the rack, all others remain fast in their positions.

35,787.—A. Spencer, of Grampian Hills, Pa., for Improvement in Cider Mills:

I claim the combination in the manner shown and described, of the disks, E G, and shafts, F B, with the roller, d, frame, H, and spring, I, all as set forth.

[This invention relates to an improved cider mill of that class which crush and compress the juice from the apples simultaneously. The object of the invention is to obtain a simple and efficient device for the intended purpose, and one in which the pomace will be separated from the juice, and discharged from the machine at a separate point.]

35,788.—F. B. Stevens, of New York City, for Improvement in Valves for Heating Feed Water for Steam Engines. Patented in England, October 10, 1861:

I claim, first, The additional eduction valve openings, 6 7 8 10 and 11, formed by narrow ports in a slide valve, and arranged to be wide open when this valve is midway in its throw, substantially as shown and described.

I also claim these ports in combination with heating the feed water of a steam engine by steam withdrawn from the induction side of the piston through an aperture made in the center of the length of the cylinder.

Second, In the same connection and combination forming these additional eduction ports on the two sides of a three-ported valve.

Third, In the same connection and combination using the pressure of steam from the boiler to keep the additional eduction slide valve on its seat.

35,789.—F. B. Stevens, of New York City, for Improvement in Heating Feed Water for Steam Boilers. Patented in England, October 10, 1861:

I claim, first, The additional eduction valves as shown and described, closing when the piston is at a sufficient distance from the end of its stroke to allow the main eduction valve to open with lead.

Second, The combination of the additional eduction valves, the closed heater and the injection and withdrawing pumps, substantially as shown and described.

Third, The arrangement and combination of the two pumps, differing in capacities, as described.

Fourth, The weighted check valve or its equivalent, placed between the injection pump and heater.

Fifth, The plunger pump having a valve placed in the hollow plunger, and having the plunger packed by two stuffing boxes, one at the top of the pump, and the other at the entrance of the pipe or chamber.

I make all these claims only in connection and combination with heating the feed water by steam withdrawn from the induction side of the piston.

35,790.—J. A. Talpey, of Somerville, Mass., for Improvement in Hand Sawing Machines:

I claim the saw, D, having its teeth constructed as represented, and arranged with its axis below the table, so as to cut with the grain of the wood, and thus draw forward the material being cut, in combination with the toothed wheel, k, and its operating mechanism, which will by their positive regular feeding action prevent the saw from being choked by its own tendency to draw the material forward, in the manner and substantially as specified.

35,791.—J. H. Valentine, of Sparta, Ill., for Improvement in Beehives:

I claim the arrangement of the pins, d d, and glass bulbs, c c, in combination with the lower part of the hive, and with the bench, B, in the manner described for the purpose specified.

35,792.—William Van Anden, of Poughkeepsie, N. Y., for Improvement in Harvesters:

I claim, first, The combination of the gear wheel, G, with the bearing, f2, forming an extension of the box, F, as a method of suspending the said gear wheel, G, upon the frame, so as to permit it to vibrate with the rocking motion of the frame, in contradistinction to the usual method of suspending the main gear wheel directly upon the axle, A, thereby causing it to conform to the motion of the axle, instead of conforming to the rocking or vibratory motions of the other gear wheels suspended on the frame, to cause an easy and comparatively speaking frictionless motion in all the gearing wheels for operating the cutters.

Second, I also claim the use of the compound coupling box, substantially as described, in combination with the propelling wheel, B2, and gear wheel, G, for the purposes set forth.

Third, I also claim the use of the guide boxes, K, in combination with the axle, A, and frame, C, substantially as set forth and for the purpose described.

Fourth, I also claim the method of making the inverted U-shaped eye, in the end of the cutter bar, in combination with the plate, r2, substantially as described and for the purposes set forth.

35,793.—J. M. Wallis, of Milton, Iowa, for Improvement in Portable Fences:

I claim giving to the upright posts or standards, A, which support the longitudinal rails, B, alternately an inclination in opposite directions, substantially as and for the purpose specified.

And I also claim the arrangement of the braces, b, projecting alternately in opposite directions from the inclined posts, a, in combination with the rails, 6′ 6′*, having their ends inserted side by side between the posts, a, as described, thereby forming a tie and producing a firm fence with only one brace on each standard.

[This invention consists in giving to the upright posts or standards to which the longitudinal rails are secured, alternately an inclination in opposite directions, so that each panel presents a warped surface, and that when the tops of the several uprights are brought in line their bottom ends or feet form a zig-zag line, whereby the stability and firmness of the fence is considerably increased.]

35,794.—Anson Warren and J. W. Martin, of Maquoketa, Iowa, for Improvement in Water Elevators:

We claim, first, The relative arrangement of the winding pulley, C, and wheels, D D′, constructed as described, and operating in connection with the cord, N, guides, K K′, and buckets, E E′, in the manner and for the purposes specified.

Second, The combination of the spiral bow-shaped guides, K K′, swivels, H, horizontal arms, I, and flat links, J, all constructed, arranged and operating in the manner and for the purposes set forth.

Third, The combination of the cross beams, L M, automatic valve, F G, hinged link, J, and spout, e, operating in the manner explained, to first tilt the bucket, and afterward discharge the water through the spout, a or a′.

35,795.—Robert Weir, of Philadelphia, Pa., for Improvement in Projectiles:

I claim the projectile consisting of the elongated and pointed head, A, and the stem, B, the latter being composed of alternate ribs and grooves, and the whole being constructed substantially as and for the purpose set forth.

35,796.—A. L. Weymouth, of Boston, Mass., for Improved Bit for Taming Horses:

I claim the combination of the pivoted levers, E E′, with each other, and with the bars, b b′, in the manner and for the purpose shown and described.

[This invention consists in constructing the bit in such a manner that the mouth of the animal may be opened at the will of the rider or driver, and when not required to be operated with this special view, be capable of being used as an ordinary bit, thereby avoiding the use of two bits which were heretofore necessary.]

35,797.—J. S. Wheat, of Wheeling, Virginia, for Improved Tanning Vat:

I claim, first, The arrangement of the iron bolts, c, running through the planks, a, of the shell, A, in combination with the tongues and grooves, b, constructed and operating as and for the purpose described.

Second, The arrangement of the framed timbers, B B′ C, and bolts or stirrups, d d′ e, in combination with the shell, A, as and for the purpose specified.

Third, The lugs, l, under the timbers, B**, which pass over the manholes, in combination with bolts, d**, as and for the purpose set forth.

35,798.—A. J. White, of East Foxborough, Mass., for Improvement in Nibs for Scythe Snaths:

I claim, first, A double or compound nib consisting of the handles, a b, connected by braces, g h, substantially as described.

Second, I claim the toothed rings, k m, in combination with the spindle, c, for adjusting the position or incline of the handle, b, to the snath, substantially as set forth.

35,799.—A. E. Young, of Dorchester, Mass., for Improved Glass Table Casters:

I claim the glass caster stand, made substantially as described, viz., with a chambered and silvered or light-reflecting base, and a glass or transparent bottle stand.

I also claim making the said bottle stand with annular flanches or cups, arranged with respect to its upper surface, and cast in one piece with the remainder of the bottle stand, substantially as described.

35,800.—G. R. Boynton (assignor to G. G. Pope and E. F. Slocum), of Chicago, Ill., for Improvement in Lanterns:

I claim the jacket, F, in combination with the spiral wire or partition, d, placed in the space, a, between the jacket and the oil cup or fountain, B, substantially as and for the purpose set forth.

[The object of this invention is to supply the flame of the lamp, while in the lantern, with air in such a manner that the flame will not be liable to be affected by the swinging of the lantern, or be extinguished by a sudden movement of the same, a contingency of frequent occurrence in using the ordinary lanterns, especially if coal oil be employed as a burning material.]

35,801.—J. S. Bradford (assignor to J. C. Manning), of Baltimore, Md., for Improvement in Burners for Coal-Oil Lamps:

I claim the application and use of vulcanized india rubber, as a base or bottom for burners for coal-oil or kerosene-oil lamps, and the flange or cut off thereto, thereby breaking the metallic connection, and preventing the communication of heat from the burner to the lamp or to the metallic socket in which said burner is fixed or screwed, in the manner and for the purpose set forth.

35,802.—Benjamin Douglas (assignor to W. and B. Douglas), of Middletown, Conn., for Improvement in Pumps:

I claim the securing of the pump cylinder, A, to its plank, D, by means of brackets, C C, formed of two parts, b c, connected together by bolts, d, and fitted on the cylinder, substantially as and for the purpose set forth.

35,803.—George Nettleton, of Woodbury, Conn., assignor to A. F. Abbott, of Waterbury, Conn., for Improvement in Sash Fasteners:

I claim the combination of the bolt, B, spiral spring, E, and lever, C, when the latter is fitted in a plate, D, by means of a segment projection, e, provided with a V-shaped notch, f, and all applied to the sill of the sash, substantially as and for the purpose set forth.

[This invention consists in the employment of slide bolt, spring, lever and plate, arranged in such a manner that a very simple and efficient sash stop or fastening is obtained, one that may be readily operated to relieve the sash, be not liable to get out of repair, and capable of having its parts adjusted together for use, without the aid of any rivets or bolts, thereby admitting of the fastening being constructed at a very moderate cost.]

35,804.—Arad Woodworth, 3d, of New York City, assignor to himself, Albert Bridges and J. C. Lane, of Jersey City, N. J., for Improvement in Smoking Tubes:

I claim the combination with the smoking tube of a suitable passage, substantially such as described, for the purpose of so conducting the smoke to the mouth piece, essentially as set forth, as to avoid passing it through the body of tobacco or filling, for the purpose specified.

RE-ISSUES.

1,320.—S. L. Avery, Norwich, N. Y., for Improvement in Water Elevators. Patented May 8, 1860:

I claim coupling a crank to any windlass shaft, in such a manner that the said crank can be instantly uncoupled from said shaft, and then be used as a brake lever, for the purpose of checking or controlling the reverse movements of the said windlass shaft, all substantially as set forth.

I also claim arranging a crank with a windlass shaft, a ratchet wheel and a pall, in such a manner that the instant the said crank is uncoupled from the windlass shaft, a further action upon said crank will relieve the ratchet wheel from the action of the pall, and also cause a friction brake to so act upon the windlass shaft as to check or control its reverse movements, all substantially as set forth.

1,321.—J. R. Baylis, of Baltimore, Md., for Improved Double Cone Marine Propellers. Patented December 10, 1861:

I claim the construction of a double or single cone propeller, having its oars or blades constructed, and when arranged relatively to the hub or axis, substantially as and for the purpose described.

1,322.—A. W. Gray, of Middletown, Vt., for Improvement in Horse Powers. Patented September 9, 1856:

I claim constructing the links which compose the endless chains of corrugated and bent sheet metal, so that the corrugations shall serve both as hinges for connecting the links, and as cogs to gear into the cog wheels of the driving shaft, substantially as specified.

I also claim the friction rollers, a a, only partially perforated for the reception of their bearings, b b, which have no shoulders, arranged and operating substantially as and for the purpose set forth.

I also claim the method of forming the tenons on the ends of the cogs, to enter the mortises of the sheet metal links by means of the simple saw kerfs, substantially as specified.

DESIGNS.

1,610.—Garrettson Smith and Henry Brown, of Philadelphia, Pa., assignors to Smith, Francis and Wells, of Springville, Pa., for Design for a Cook's Stove.

1,611.—George Taylor and James Lusty, of Amesbury, Mass., for Design for Shoes.

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Every applicant for a Patent must furnish a model of his invention if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

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Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

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All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

D. A. C., of Colorado Territory.—It seems to us that the walls of a gun would be weakened by making cylindrical holes in them parallel with the bore, even though the iron around these holes should be cooled by water circulating through them, on Rodman's plan of casting cannon.

G. W. K., of Pa.—The specimen which you send us is magnetic oxide of iron, one of the most valuable iron ores.

F. W. T., of Md., and W. M. A., of Ohio.—The experiments, both in this country and England, have shown that the larger iron plates are, and the more solid their supports, the better will they resist the force of shot. It may be, however, that some degree of elasticity would tend to prevent the frame of the vessel from being crushed in.

Invention, of N. Y.—Lead may be silver plated by means of electricity, though it does not adhere very firmly.

M. L. G., of N. Y.—Your suggestion to have the turret of the *Monitor* revolve on rollers, has already appeared in our paper, as well as all of your other suggestions. See the communication from one of her officers in another part of this number.

A. W., of N. Y.—We have been informed that the first passenger locomotive run in this State, was on the old Mohawk and Hudson River Railroad, between Albany and Schenectady.

T. H. M., of Munich.—We do not see anything especially worthy of notice in your mode of constructing war vessels. Substantially the same views have been suggested to us before.

M. E. M., of N. Y.—There is no standing premium for the production of a perpetual motion. This subject, of late years, has ceased to attract the attention of men of science. If you have anything new in the way of screw drivers we can probably tell after examination.

J. W. G., of Iowa.—It appears to be useless to undertake to get letters to you through your post office. We have written you two letters, one under date of March 12th, the other April 15th. We take note of your remarks about the steam wagon enterprise. It has always appeared to us a doubtful scheme to undertake to run steam carriages on common roads, as an economical experiment.

D. C. G., of Iowa.—You ask, "If A obtains a patent for a machine, sells territory to B, and, after selling to B, A gets a patent for an improvement on the same machine, has A the right to sell the original machine with the patented improvements, on B's territory, or has B the right to use the said improvements?" Answer.—A has no right to sell the original machine with his patented improvement in B's territory, nor has the latter any right to use or sell the patented improvement of A.

E. J. A., of N. H.—Cannot furnish No. 3, Vol. VI., as it is out of print. No person can tell what caused the intermittent flow of water in your log, without an examination of its position, and a knowledge of all the circumstances connected with the phenomenon.

A. E. W., of N. Y.—Very little of the timber of California is suitable for manufacturing purposes, and all the iron and steel used in that State are imported.

M. J. C., of Iowa.—Hydraulic cement is made of a peculiar limestone. A cement similar to it may be made by mixing the dust of burnt brick with highly-burned common lime. To make Plaster of Paris, gypsum is roasted in brick troughs until all its water is expelled, after which it is exposed in sheds to the atmosphere, and finally ground to powder for common use. It will not make good mortar, but for plastering the interior of buildings it is excellent.

P. R. S., of Conn.—You have a perfect right to use india-rubber rollers in making clothes wringers, but we think you will find difficulty in getting them made by any reliable company. The Metropolitan Washing Machine Company seems to control the manufacture of the article.

F. S., of Mass.—We have carefully read your article on the Art of Measuring Time. It is too long for our use, and before it would be fit to publish it would need a good deal of pruning. In its present condition we cannot use it.

R. B., of C. W.—The embossing plates or dies for envelopes may be made either of cast or wrought iron, steel or brass. Bronze dies are used in some embossing presses. They are first cast, then finished by hand.

J. A., of Ill.—Gutta percha and india rubber are insoluble in alcohol, but whether they would make good canteens or other vessels for holding whisky, we do not know, for we are not acquainted with any person who has made the experiment.

A. B. L., of Conn.—Give us your opinion respecting the cause of the belt working toward the edge of your counter pulley, since you have intimated that you know it.

H. W. H., of Ind.—Nassau is the chief port in New Providence, one of the British West India Islands. It is a perfect nest for smugglers running the blockade on our Southern coasts.

A. S. H., of N. Y.—A common hair lotion for coloring the hair is composed of alcohol one pint, a table spoonful of castor oil, one-fourth of an ounce of sugar of lead, and the same quantity of flowers of sulphur. The sulphur should be mixed with the alcohol for about six hours before the other substances are added. Applied to grey hair it changes it generally into a dark brown color. It is sometimes sold as a hair restorative for about one dollar per quart, in bottles.

F. A. M., of N. Y.—A ventilating hat, with a series of holes in the sides and nother set in the crown, is not new. Such hats are quite common in this city and in Philadelphia.

A. K., of Ky.—Watches the steel parts of which have been converted into magnets, can only be completely renovated by substituting new steel parts for the old. Steel magnets may be demagnetized by heating them to a low red heat.

M. S. H. and J. L., of N. Y.—E. Geyline resides in Philadelphia, J. Stephenson in this city—place of business, Novelty Works.

J. P., Jr., of Iowa.—There is no work published, to our knowledge, which contains the information you request, respecting "ornamental painting for cars, &c."

L. M. D., of Ohio.—Transparent varnish for covering polished iron, may be made with white seed lac dissolved in alcohol. The metal should be warm when it is put on. This varnish is easily scratched. We recommend a coating of pure linseed oil, boiled with a small quantity of the sulphate of zinc, as being superior to the lac varnish for covering the polished iron work of plows, to prevent it from rusting.

S. W., of N. J.—You can only find out by experiment what colors can be mixed with coal tar for the purpose of painting out houses. Common brown paint is made by mixing "Spanish Brown," white lead and lampblack with linseed oil. Although oil paint is most expensive at first for out houses, it is cheapest in the end, because it endures so much longer.

H. G. L., of Ind.—One-fourth of an inch of outside lap in your slide valve, we do not think, will affect its operation to any sensible extent when set with lead.

B. S., of Pa.—In softening steel it only requires to be highly heated, but in order to preserve its surface from oxydation, it should be covered with some paste, such as that of flour, or buried in charcoal dust and excluded from the air.

H. J. T., of N. Y.—The iodide of lead is prepared by adding a solution of the iodide of potassium to a solution of acetate of lead, when a yellow insoluble precipitate falls to the bottom of the vessel. This precipitate is the iodide of lead, the spangles of which are of the color and luster of burnished gold.

J. McD., of Pa.—Fulminating mercury is produced by adding a solution of the nitrate of mercury to alcohol. The process is very dangerous, and the operation must be performed with great caution. This substance is chiefly used for priming percussion caps.

R. W. S., of Mass.—Any cast iron for molding may be treated in a very simple manner to secure improved castings. Take a pole of green timber and stir up the fluid iron when it is first run into the ladle, then allow it to become still, skim off the scoria from the surface and pour the metal into the molds.

G. McD., of C. W.—Water power is much cheaper than steam power, for a woolen factory, in your part of the country, because coal is comparatively high in price. Near the market, such as in the vicinity of our great cities, and where coal is cheap, steam power may be most economical, all things considered.

O. W. A., of N. J.—We advise you to use the chloride of lime as a disinfectant in your cellar. A pound of copperas dissolved in a pailful of hot water and poured into your sink, will remove the fetid smell.

T. J. E., of Mass.—Most of the fine cotton thread used in America is made in Scotland, where thread making has formed a special branch of manufacture for nearly two centuries. The City of Paisely is distinguished for thread manufactories, and for the weaving of fine shawls. Clark's thread has a very high reputation.

R. H. T., of N. Y.—The pickle which is employed for brightening brass is made with equal parts of nitric and muriatic acids, diluted with four times their bulk of water. Sulphuric acid diluted with three times its weight of water, and used hot, also makes a good brightening pickle for brass, which must be thoroughly washed in hot water afterwards, and then dried in warm saw-dust.

P. B., of Vt.—The samples of supposed gold which you have sent us are iron pyrites. Gold in its natural state is soft and metallic and very different from hard crystalline ores like those which have deceived you.

M. L. R., of N. Y.—A strong solution of isinglass is the best cement you can use for joining leather bands. It may be kept from becoming moldy by adding to it some whisky and a little of the essential oil of cloved, or a little camphorate spirits.

R. W., of N. H.—Methylated spirits are obtained by distilling wood in iron retorts. Beach, birch and maple yield large quantities of wood spirits. It requires an experienced person to conduct the operations of distilling wood. The clear, strong, acetic acid that is employed in making the acetate of iron, is obtained by distilling wood.

W. W. R., of Ohio.—The nitrate of silver is prepared by adding small pieces of pure silver to nitric acid (aquafortis) until effervescence ceases. The solution then formed is clear and caustic. It stains the hair, skin, and almost all animal substances, black. When boiled for a considerable period, it deposits beautiful clear crystals. It is very poisonous. Stains of nitrate of silver may be removed by the cyanide of potassium. We advise you not to use it for coloring your hair.

J. W. L., of H.—Scrub your starch vats and wash them regularly with hot water, in warm weather, and you will prevent the fermentation to which you refer, whereby you have lost so much starch.

T. S. McF., of Miss.—Fire clay is abundant in New Jersey, and American made fire bricks are equal to those that are made in England.

C. G. A., of Mass.—The returns of the census for 1860 are being prepared for publication.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, July 9, 1862:—

G. H. H., of N. Y., $20; J. L., of Wis., $20; H. R., of Ill., $20; R. & P., of Mass., $20; J. H. & G. W. S., of N. Y., $20; S. H., of Ind., $45; W. M., of Ohio, $20; H. C. F., of Vt., $20; T. W. W., of Mich., $20; T. & M., of Conn., $20; J. K. B., of Ill., $20; J. H., of Pa., $10; G. C., of N. Y., $20; E. M., of N. Y., $10; J. C. P., of N. J., $20; D W. H., of Cal., $40; E. H. S., of Pa., $15; A. J., of Conn., $25; D. S., of Cal., $250; R. J. A., of Mich., $15; S. M., of N. Y., $15; J. H. McG., of Ohio, $15; S. H., of Ind., $15; J. F. D., of Ind., $25; J. P. A., of Ill., $25; J. B., of Ill., $25; R. H. C., of N. Y., $25; A. F. P., of N. Y., $25; C. S. L., of N. J., $15; N. S., of Conn., $15; R. C., of Mich., $15; E. W. Van D., of Ohio, $15; B. & B., of Ill., $25; W. L., of Iowa, $25; J. B., of N. Y., $15; W. H. L., of Ind., $15; D. T. G., of Ind., $225; M. T., of Iowa, $10; S. H., of N. H., $25; J. M. H., of Pa., $25; J. M. & W. C. W., of Iowa, $25; M. C. B., of Minn., $25; G. D. H., of Ill., $15; W. O. F., of N. Y., $15; A. S. L., of N. Y., $250; H. B., of Iowa, $15; J. W. R., of Conn., $10; B. R., of Mass., $250; J. K. H., of Ind., $20; H. N., of N. Y., $10; J. M., Jr., of Ill., $15; J. C., of N. Y., $10; J. A. R., of N. J., $25; P. W. McK., of N. J., $25; J. C. R., of N. Y., $25; H. W., Sr., of N. J., $25; T. & B., of N. Y., $25; A. C. G., of N. Y., $30; B. R., of N. Y., $35.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from July 2 to Wednesday, July 9, 1862:—

I. B., of Ill.; J. A. R., of N. J.; J. P. A., of Ill.; A. T. P., of N. Y.; R. H. C., of N. Y.; P. W. McK., of N. J.; J. C. R., of N. Y.; J. F. D., of Ind.; C. H., of N. Y.; H. W., Sr., of N. J.; A. J., of Conn.; T. & B., of N. Y.; D. W. H., of Cal.; A. C. G., of N. Y.; B. R., of N. Y.; B. & B., of Ill.; J. M. H., of Pa.; W. L., of Iowa; R. A. G., of Wis.; J. K. H., of Ind.; J. D. L., of N. Y.; J. M. & W. E. W., of Iowa; M. C. B., of Minn.; S. H., of N. H.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000; Belgium, 5,000,000, Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

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INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO., No. 37 Park-row, New York.

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TO PHOTOGRAPHERS.—IMPROVED PHOTOGRAHIC Camera, Patented March 25, 1862, by A. B. WILSON (Patentee of the Wheeler and Wilson Sewing Machine), adapted to all photographic work; such as Landscapes, Stereoscopic Views, Carte Visites, Ambrotypes, &c. Can be used by amateurs and others from printed directions. Send for a circular. Address A. B. WILSON, Waterbury, Conn. 1tf

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Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Offices are cordially invited to call at their office.

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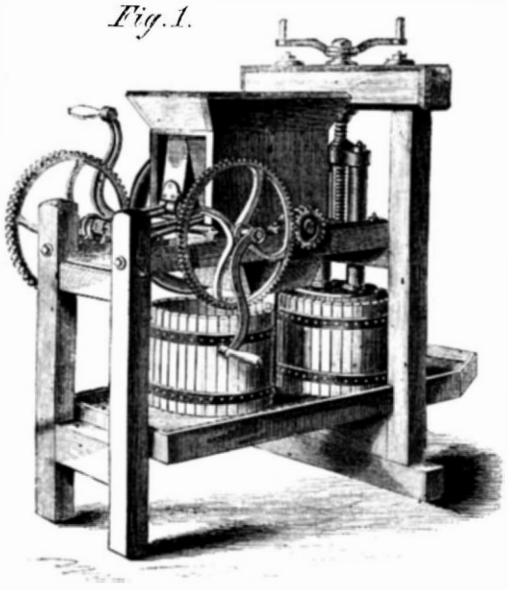
Improved Cider and Wine Mill.

The cider mill here illustrated combines the grinding apparatus and the press in one machine; the grinding apparatus embracing also a crushing device, so that a complete mill is formed in one compact machine.

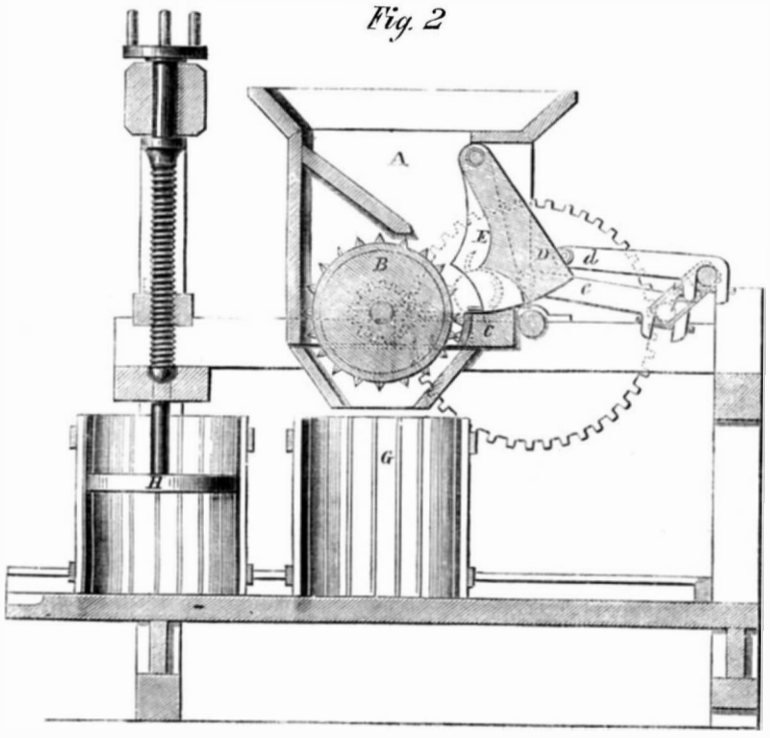
Fig. 1, is a perspective view of the machine and Fig. 2, a vertical section. The fruit is placed in the hopper, A, and falls down between the rotating cylinder, B, and stationary concave, C, both furnished with teeth for tearing the fruit in pieces.

Fig. 1.



Two crushers, D and E, are suspended at their upper ends within the hopper, and are caused to swing toward and from the cylinder, B, by means of a crank shaft, *f*, Fig. 1, through the medium of the connecting rods, *d* and *e*, Fig. 2. Each of the crushers has a projection on the side next the cylinder, B, forming this surface into two concaves, by which means the fruit is caught and held down while it is being torn by the revolving teeth. This is one of the principal features of novelty in this mill, and is claimed to give a decided superiority over mills which have no device for holding the fruit down while it is being crushed.

Fig. 2



GATES'S CIDER AND WINE MILL.

After the fruit is crushed it falls into the receptacle, G, which is formed of staves a short distance apart held together by iron hoops in the usual manner. Two of these cylinders are prepared, and when one is filled it is placed under the piston or follower, H, where the juice is expressed from the pulp, while the second cylinder is being filled. The piston, H, fits the cylinders not too tightly, and is forced down by a screw in the usual manner.

The concave, C, is secured to the frame of the machine by a set screw so that it may be adjusted at such distance from the cylinder, B, as may be deemed advisable. The several motions described are effected by gear wheels and pinions of ordinary construction.

The inventor says that he has sold several hundred of these mills, and that in all cases they have given satisfaction; he has never yet had a single complaint. In several trials they have been awarded the highest premium for lightness of power, speed of work, &c. He further says that the mill will make from six to eight barrels of cider per day, that it is well suited for crushing and pressing grapes, that it forms an excellent cheese press and lard press, that it is very portable and occupies little space.

The patent for this invention was granted, through the Scientific American Patent Agency, October 29, 1861, and further information in relation to it may be obtained by addressing the inventor, J. R. Gates, or W. B. Wilson (to whom an interest in the invention has been assigned), both at Louisville, Ky.

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Such is the eloquent apostrophe to photography written by the eminent publisher, L. Curmer, in his prospectus of a magnificent edition of "*Les Evangiles*," he is now publishing in Paris. Remarkable as are all the productions of this enthusiast, especially his "*Imitation de Jesus Christ*" his "*Heures de la reine Anne de Bretagne*," this new edition of the Evangelists surpasses them all, and this excellence is due entirely to photography. A short description of this bibliographical curiosity may not be without interest.

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FROM THE STEAM PRESS OF JOHN A. GRAY

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